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BY PROXY, By David Gordon

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EDITORIAL

REPORT ON THE DEAN DRIVE

SINCE Analog is not a news magazine, our publication schedule is geared to the leisurely —and money-saving— pace of non-rush publication. This is being written roughly two weeks after the June issue, carrying the discussion of the Space Drive problem, and the photographs of the Dean drive was officially on the stands. This is, then, a first report on results.

1. The first magazine report on the Dean drive published anywhere was the mention in the December, 1959 editorial that I had seen photographs that indicated that an inertia-drive system had been developed. There were a number of inquiries then, and some follow-ups.

Among those was Wellesley Engineering, Inc., of Waltham, Massachusetts. They got in touch with Dean, and went to work on the problem. I heard of their results just after the June issue appeared.

Mr. Cal Isaacson, of Wellesley Engineering, tells me they built a duplicate of the Dean model, and tested it, in their own shops. It produced thrust, as Dean stated.

The Wellesley Engineering group then designed several modified setups of their own—variant applications of Dean's phasing principle. The first two variants which had been built and tested as of May 30, 1960, both functioned and produced thrust. Dean's basic phasing principle is a true repeatable experiment.

2. I have heard from two other sources which have asked me not to publish names and addresses as yet. (They're out for improvement patents under Dean's basic patent, no doubt, and prefer to get results rather than publicity.) Both had built Dean models, tested them, and found thrust as stated. One of the groups had gone to work directly from the magazine article and photographs—the Patent Office was tem-

porarily unable to supply copies of the Dean patent.

To date, seven of the nation's greatest corporations have taken active measures to investigate the possibilities of the device, to my direct, personal knowledge. How many others Mr. Dean has heard from is, of course, his business.

In contrast, on April 26, 1960, a letter from a NASA scientist to Mr. Dean repeated the statement that the device could not operate as claimed, and that the apparent thrust was due to vibration effects in the scales Dean used in his portable demonstrator. (He carries it in a suitcase, when taking it somewhere to demonstrate.) NASA has rejected any further discussion of the matter.

I have received, at my office, a number of letters making a similar suggestion—that the effect is due to nonlinear friction effects in the bathroom scales Dean uses.

For a portable demonstrator, the bathroom scales represent the most practical and simple device. Dean has, however, tested the machines using strain-gauges and oscilloscope tracings. The equipment required for such a test—the type of test that should, of course, be applied to such a device—is portable only in the Navy's definition of the term "portable." Anything you can carry around on a battleship is "portable" so far as the Navy's concerned. You don't, however, pack strain-gauge setups in a suitcase. Dean has repeatedly asked the various scientific agencies who claim "it's just vibration" to use their already-available, elaborate and accurate vibration-analysis equipment, and determine the facts, instead of stating it as an authoritative guess. None—including NASA—has been willing to do so.

The above statements are *data*—i.e., documentable facts, not guesses or unverifiable claims.

Now there is need to discuss the political-economic-legal-ethical tangle involved in Dean's work—or, in point of fact, any work of a breakthrough inventor.

It's been asked, in letters I've received, why, since the government scientists wouldn't listen, Dean didn't get industrial scientists interested.

The answer's easy; his device does, in fact, work. If he had—back in 1956 or 1957, say—turned to private industry, and the first true space-drive vehicle had been produced privately, what would the probable results have been?

I suspect Dean would have wound up in a private cell somewhere in the middle of Antarctica, with the key lost down a glacier crevasse. He would have been guilty of breaking secrecy on the most important military development of the century. He would have revealed, to non-top-secrecy-cleared individuals a device which clearly belonged under the TOP SECRET: BURN BEFORE OPENING! category. The story would have been out privately, which, with no security system covering it from foreign agents, would have

meant that Dean was responsible for the United States' loss of the secret.

Until the United States government itself, by officially publishing the patent, put an absolute and permanent end to any possibility of secrecy—Dean was compelled to treat it as a top-secret device which could be discussed only with government agents.

Please note carefully: any inventor with a break-through device of any kind which might have military application, is necessarily in the same position. He *must* interest the government scientists; he must not apply to industry until the government itself, through the Patent Office publication, breaks secrecy.

Now it is perfectly true that there is no law to that effect; there probably won't be. But let's not be stupid, huh? There was no law specifically saying a disk jockey couldn't accept favors for favors he did a recording company—but when the public opinion is that he ought not to have done it, the lack of a law has surprisingly little meaning. Sure, the Constitution has specific prohibitions against *ex post facto* laws, and bills of attainder —legally, you can't pass a law making someone guilty on the basis of what he did before the law was passed, nor can you pass a law making being Quintus Z. Cuddnunk, of 1313 Thirteenth St., Misereyville, Illinois, illegal.

That's nice and legal. Now shall we talk sense, about what happens to some guy whom the Great American Public decides is the worst traitor of this century? If they can't get him locked up for anything else, they'll get him for not having broken the tax stamp on a pack of cigarettes he opened back on May 11, 1956, which was then a Federal offense, and within the statute of limitations.

Of course, if the inventor is perfectly sure his device won't really work—if *he* knows it won't work—then he's perfectly safe in going to industry before the government breaks secrecy on it.

But we're talking about break-through inventions where the inventor has something that does—or something he is solidly convinced does—work. Under those conditions, he's stuck; he can't take his invention to private industry . . . if he wants to retain a whole skin and a sound reputation after it is recognized that he has a major break-through.

My personal feeling is that there is great danger that someone is going to get it thoroughly in the neck because of the security break on Dean's device. Which will be a crime and a shame, because the guilt lies not on any man, but on the one-party, orthodoxy type system we have in Science. Mr. Dean was, however, wise enough to so act as to make certain that his hands were perfectly free of guilt; the government, not Norman Dean, broke security. The Patent Office published the news in May, 1959, just one year before Analog did.

The inventor with a break-through device then runs into another major blockade—also government caused. The matter of getting someone to finance the usually costly steps between working model—test-tube stage—and production-line units. The developmental research required to go from Dean's laboratory models to a commercially producible replacement for helicopters, say, represents

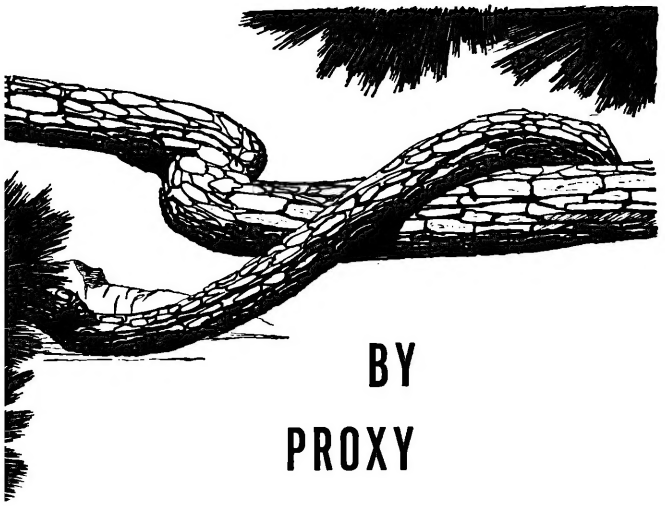
(*Continued on page* 175)

MISTER BREGER

"You're wasting your time—the government simply WON'T be bothered with crackpot ideas for invisible anti-gravity platforms . . ."

(Ordinarily we don't run cartoons—but this was timely and appropriate.)

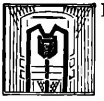
Illustrated by Van Dongen



BY PROXY

By DAVID GORDON

It's been said that the act of creation is a solitary thing—that teams never create; only individuals. But sometimes a team may be needed to make creation effective. . . .



R. Terrence Elshawe did not conform to the mental picture that pops into the average person's mind when he hears the words "news reporter." Automatically, one thinks of the general run of earnest, handsome, firm-jawed, level-eyed, smooth-voiced gentlemen one sees on one's TV screen. No matter which news service one subscribes to, the reporters are all pretty much of a type. And Terrence Elshawe simply wasn't the type.

The confusion arises because thirty-odd years of television has resulted in specialization. If you run up much Magnum Telenews time on your meter, you're familiar with the cultured voice and rugged good looks of Brett Maxon, "your Magnum reporter," but Maxon is a reporter only in the very literal sense of the word. He's an actor, whose sole job is to make Magnum news sound more interesting than some other telenews service, even though he's giving you exactly the same facts. But he doesn't go out and dig up those stories.

The actual leg work of getting the news into Maxon's hands so that he can report it to you is done by research reporters—men like Terrence Elshawe.

Elshawe was a small, lean man with a large, round head on which grew close-cropped, light brown hair. His mouth was wide and full-lipped, and had a distinct tendency to grin impishly, even when he was trying to look serious. His eyes were large, blue, and innocent; only when the light hit them at just the right angle was it possible to detect the contact lenses which corrected an acute myopia.

When he was deep in thought, he had a habit of relaxing in his desk chair with his head back and his eyes closed. His left arm would be across his chest, his left hand cupping his right elbow, while the right hand held the bowl of a large-bowled briar which Elshawe puffed methodically during his ruminations. He was in exactly that position when Oler Winstein put his head in the door of Elshawe's office.

"Busy?" Winstein asked conversationally.

In some offices, if the boss comes in and finds an employee in a pose like that, there would be a flurry of sudden action on the part of the employee as he tried frantically to look as though he had only paused for a moment from his busy work. Elshawe's only reaction was to open his eyes. He wasn't the kind of man who would put on a phony act like that, even if his boss fired him on the spot.

"Not particularly," he said, in his slow, easy drawl. "What's up?"

Winstein came on into the office. "I've got something that might make a good spot. See what you think."

If Elshawe didn't conform to the stereotype of a reporter, so much less did Oler Winstein conform to the stereotype of a top-flight TV magnate. He was no taller than Elshawe's five-seven, and was only slightly heavier. He wore his hair in a crew cut, and his boyish face made him look more like a graduate student at a university than the man who had put Magnum Telenews together with his own hands. He had an office, but he couldn't be found in it more than half the time; the rest of the time, he was prowling around the Magnum Building, wandering into studios and offices and workshops. He wasn't checking up on his employees, and never gave the impression that he was. He didn't throw

his weight around and he didn't snoop. If he hired a man for a job, he expected the job to be done, that was all. If it was, the man could sleep at his desk or play solitare or drink beer for all Winstein cared; if the work wasn't done, it didn't matter if the culprit looked as busy as an anteater at a picnic—he got one warning and then the sack. The only reason for Winstein's prowling around was the way his mind worked; it was forever bubbling with ideas, and he wanted to bounce those ideas off other people to see if anything new and worthwhile would come of them.

He didn't look particularly excited, but, then, he rarely did. Even the most objective of employees is likely to become biased one way or another if he thinks his boss is particularly enthusiastic about an idea. Winstein didn't want yes-men around him; he wanted men who could and would think. And he had a theory that, while the tenseness of an emergency could and did produce some very high-powered thinking indeed, an atmosphere of that kind wasn't a good thing for day-in-and-day-out work. He saved that kind of pressure for the times that he needed it, so that it was effective because of its contrast with normal procedure.

Elshawe took his heavy briar out of his mouth as Winstein sat down on the corner of the desk. "You have a gleam in your eye, Ole," he said accusingly.

"Maybe," Winstein said noncommittally. "We might be able to work something out of it. Remember a guy by the name of Malcom Porter?"

Elshawe lowered his brows in a thoughtful frown. "Name's familiar. Wait a second. Wasn't he the guy that was sent to prison back in 1979 for sending up an unauthorized rocket?"

Winstein nodded. "That's him. Served two years of a five-year sentence, got out on parole about a year ago. I just got word from a confidential source that he's going to try to send up another one."

"I didn't know things were so pleasant at Alcatraz," Elshawe said. "He seems to be trying awfully hard to get back in."

"Not according to what my informant says. This time, he's going to ask for permission. And this time, he's going to have a piloted craft, not a self-guided missile, like he did in '79."

"Hoho. Well, there might be a story in it, but I can't see that it would be much of one. It isn't as if a rocket shoot were something unusual. The only thing unusual about it is that it's a private enterprise shoot instead of a Government one."

Winstein said: "Might be more to it than that. Do you remember the trial in '79?"

"Vaguely. As I remember it, he claimed he didn't send up a rocket, but the evidence showed overwhelmingly that he had. The jury wasn't

out more than a few minutes, as I remember."

"There was a little more to it than that," Winstein said.

"I was in South Africa at the time," Elshawe said. "Covering the civil war down there, remember?"

"That's right. You're excused," Winstein said, grinning. "The thing was that Malcom Porter didn't claim he hadn't sent the thing up. What he did claim was that it wasn't a rocket. He claimed that he had a new kind of drive in it—something that didn't use rockets.

"The Army picked the thing up on their radar screens, going straight up at high acceleration. They bracketed it with Cobra pursuit rockets and blew it out of the sky when it didn't respond to identification signals. They could trace the thing back to its launching pad, of course, and they nabbed Malcom Porter.

"Porter was furious. Wanted to slap a suit against the Government for wanton destruction of private property. His claim was that the law forbids unauthorized rocket tests all right, but his missile wasn't illegal because it wasn't a rocket."

"What did he claim it was?" Elshawe asked.

"He said it was a secret device of his own invention. Antigravity, or something like that."

"Did he try to prove it?"

"No. The Court agreed that, according to the way the law is worded, only 'rocket-propelled missiles' come under the ban. The judge said that if Malcom Porter could prove that the missile wasn't rocket-propelled, he'd dismiss the case. But Porter wanted to prove it by building another missile. He wouldn't give the court his plans or specifications for the drive he claimed he'd invented, or say anything about it except that it operated—and I quote—'on a new principle of physics'—unquote. Said he wouldn't tell them anything because the Government was simply using this as an excuse to take his invention away from him."

Elshawe chuckled. "That's as flimsy a defense as I've heard."

"Don't laugh," said Winstein. "It almost worked."

"What? How?"

"It threw the burden of proof on the Government. They thought they had him when he admitted that he'd shot the thing off, but when he denied that it was a rocket, then, in order to prove that he'd committed a crime, they had to prove that it *was* a rocket. It wasn't up to Porter to prove that it *wasn't.*"

"Hey," Elshawe said in admiration, "that's pretty neat. I'm almost sorry it didn't work."

"Yeah. Trouble was that the Army had blown up the evidence. They knew it was a rocket, but they had to prove it. They had recordings of the radar picture, of course, and they used that to show the shape and acceleration of the missile. They proved that he'd bought an old obsolete Odin rocket from one of the small colleges in the Midwest—one that the Army had sold them as a

demonstration model for their rocket engineering classes. They proved that he had a small liquid air plant out there at his place in New Mexico. In other words, they proved that he had the equipment to rebuild the rocket and the fuel to run it.

"Then they got a battery of high-powered physicists up on the stands to prove that nothing else but a rocket could have driven the thing that way.

"Porter's attorney hammered at them in cross-examination, trying to get one of them to admit that it was possible that Porter had discovered a new principle of physics that could fly a missile without rockets, but the Attorney General's prosecutor had coached them pretty well. They all said that unless there was evidence to the contrary, they could not admit that there was such a principle.

"When the prosecutor presented his case to the jury, he really had himself a ball. I'll give you a transcript of the trial later; you'll have to read it for yourself to get the real flavor of it. The gist of it was that things had come to a pretty pass if a man could claim a scientific principle known only to himself as a defense against a crime.

"He gave one analogy I liked. He said, suppose that a man is found speeding in a car. The cops find him all alone, behind the wheel, when they chase him down. Then, in court, he admits that he was alone, and that the car was speeding, but he insists that the car was steering itself, and that he wasn't in control of the vehicle at all. And what was steering the car? Why, a new scientific principle, of course."

Elshawe burst out laughing. "Wow! No wonder the jury didn't stay out long! I'm going to have to dig the recordings of the newscasts out of the files; I missed a real comedy while I was in Africa."

Winstein nodded. "We got pretty good coverage on it, but our worthy competitor, whose name I will not have mentioned within these sacred halls, got Beebee Vayne to run a commentary on it, and we got beat out on the meters."

"Vayne?" Elshawe was still grinning. "That's a new twist—getting a comedian to do a news report."

"I'll have to admit that my worthy competitor, whose name et cetera, does get an idea once in a while. But I don't want him beating us out again. We're in on the ground floor this time, and I want to hog the whole thing if I can."

"Sounds like a great idea, if we can swing it," Elshawe agreed. "Do you have a new gimmick? You're not going to get a comedian to do it, are you?"

"Heaven forbid! Even if it had been my own idea three years ago, I wouldn't repeat it, and I certainly won't have it said that I copy my competitors. No, what I want you to do is go out there and find out what's going on. Get a full background on it. We'll figure out the presentation angle when we get some idea of what he's going to do this time." Winstein eased himself off the

corner of Elshawe's desk and stood up. "By the way—"

"Yeah?"

"Play it straight when you go out there. You're a reporter, looking for news; you haven't made any previous judgments."

Elshawe's pipe had gone out. He fired it up again with his desk lighter. "I don't want to be," he said between puffs, "too cagey. If he's got . . . any brains . . . he'll know it's . . . a phony act . . . if I overdo it." He snapped off the lighter and looked at his employer through a cloud of blue-gray smoke. "I mean, after all, he's on the records as being a crackpot. I'd be a pretty stupid reporter if I believed everything he said. If I don't act a little skeptical, he'll think I'm either a blockhead or a phony or both."

"Maybe," Winstein said doubtfully. "Still, some of these crackpots fly off the handle if you doubt their word in the least bit."

"I'll tell you what I'll do," Elshawe said. "He used to live here in New York, didn't he?"

"Still does," Winstein said. "He has a two-floor apartment on Central Park West. He just uses that New Mexico ranch of his for relaxation."

"He's not hurting for money, is he?" Elshawe asked at random. "Anyway, what I'll do is look up some of the people he knows and get an idea of what kind of a bird he is. Then, when I get out there, I'll know more what kind of line to feed him."

"That sounds good. But whatever you do, play it on the soft side. My confidential informant tells me that the only reason we're getting this inside info is because Malcom Porter is sore about the way our competition treated him four years ago."

"Just who is this confidential informant, anyway, Ole?" Elshawe asked curiously.

Winstein grinned widely. "It's supposed to be very confidential. I don't want it to get any further than you."

"Sure not. Since when am I a blabbermouth? Who is it?"

"Malcom Porter."

Two days later, Terrence Elshawe was sitting in the front seat of a big station wagon, watching the scenery go by and listening to the driver talk as the machine tooled its way out of Silver City, New Mexico, and headed up into the Mogollon Mountains.

"Was a time, not too long back," the driver was saying, "when a man couldn't get up into this part of the country 'thout a pack mule. Still places y'can't, but the boss had t' have a road built up to the ranch so's he could bring in all that heavy equipment. Reckon one of these days the Mogollons 'll be so civilized and full a people that a fella might as well live in New York."

Elshawe, who hadn't seen another human being for fifteen minutes, felt that the predicted overcrowding was still some time off.

" 'Course," the driver went on, "I reckon folks have t' live some place.

but I never could see why human bein's are so all-fired determined to bunch theirselves up so thick together that they can't hardly move—like a bunch of sheep in a snowstorm. It don't make sense to me. Does it to you, Mr. Skinner?"

That last was addressed to the other passenger, an elderly man who was sitting in the seat behind Elshawe.

"I guess it's pretty much a matter of taste, Bill," Mr. Skinner said in a soft voice.

"I reckon," Bill said, in a tone that implied that anyone whose tastes were so bad that he wanted to live in the city was an object of pity who probably needed psychiatric treatment. He was silent for a moment, in obvious commiseration with his less fortunate fellows.

Elshawe took the opportunity to try to get a word in. The chunky Westerner had picked him up at the airport, along with Mr. Samuel Skinner, who had come in on the same plane with Elshawe, and, after introducing himself as Bill Rodriguez, he had kept up a steady stream of chatter ever since. Elshawe didn't feel he should take a chance on passing up the sudden silence.

"By the way, has Mr. Porter applied to the Government for permission to test his . . . uh . . . his ship, yet?"

Bill Rodriguez didn't take his eyes off the winding road. "Well, now, I don't rightly know, Mr. Elshawe. Y'see, I just work on the ranch up there. I don't have a doggone thing to do with the lab'r'tory at all—'cept to keep the fence in good shape so's the stock don't get into the lab'r'tory area. If Mr. Porter wants me to know somethin', he tells me, an' if he don't, why, I don't reckon it's any a my business."

"I see," said Elshawe. *And that shuts* me *up,* he thought to himself. He took out his pipe and began to fill it in silence.

"How's everything out in Los Angeles, Mr. Skinner?" Rodriguez asked the passenger in back. "Haven't seen you in quite a spell."

Elshawe listened to the conversation between the two with half an ear and smoked his pipe wordlessly.

He had spent the previous day getting all the information he could on Malcom Porter, and the information hadn't been dull by any means.

Porter had been born in New York in 1949, which made him just barely thirty-three. His father, Vanneman Porter, had been an oddball in his own way, too. The Porters of New York didn't quite date back to the time of Peter Stuyvesant, but they had been around long enough to acquire the feeling that the twenty-four dollars that had been paid for Manhattan Island had come out of the family exchequer. Just as the Vanderbilts looked upon the Rockefellers as newcomers, so the Porters looked on the Vanderbilts.

For generations, it had been tacitly conceded that a young Porter gentleman had only three courses of action open to him when it came time for him to choose his vocation

in life. He could join the firm of Porter & Sons on Wall Street, or he could join some other respectable business or banking enterprise, or he could take up the Law. (Corporation law, of course—*never* criminal law.) For those few who felt that the business world was not for them, there was a fourth alternative—studying for the priesthood of the Episcopal Church. Anything else was unheard of.

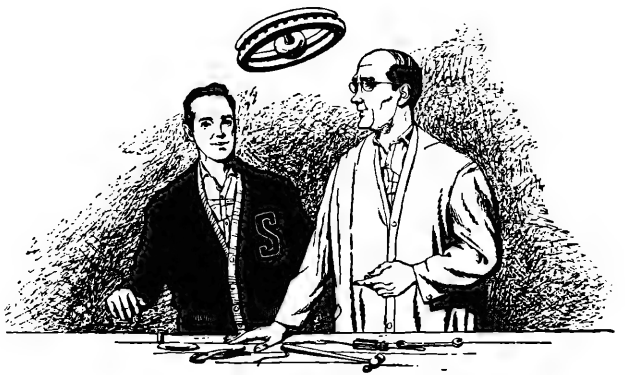
So it had been somewhat of a shock to Mr. and Mrs. Hamilton Porter when their only son, Vanneman, had announced that he intended to study physics at M.I.T. But they gave their permission; they were quite certain that the dear boy would "come to his senses" and join the firm after he had been graduated. He was, after all, the only one to carry on the family name and manage the family holdings.

But Vanneman Porter not only stuck to his guns and went on to a Ph.D.; he compounded his delinquency by marrying a pretty, sweet, but not overly bright girl named Mary Kelley.

Malcom Porter was their son.

When Malcom was ten years old, both his parents were killed in a smashup on the New Jersey Turnpike, and the child went to live with his widowed grandmother, Mrs. Hamilton Porter.

Terry Elshawe had gathered that young Malcom Porter's life had not been exactly idyllic from that point on. Grandmother Porter hadn't approved of her son's marriage, and she seemed to have felt that she must do everything in her power to help her grandson overcome the handicap of having nonaristocratic blood in his veins.



Elshawe wasn't sure in his own mind whether environment or heredity had been the deciding factor in Malcom Porter's subsequent life, but he had a hunch that the two had been acting synergistically. It was likely that the radical change in his way of life after his tenth year had as much to do with his behavior as the possibility that the undeniably brilliant mental characteristics of the Porter family had been modified by the genes of the pretty but scatterbrained wife of Vanneman Porter.

Three times, only his grandmother's influence kept him from being expelled from the exclusive prep school she had enrolled him in, and his final grades were nothing to mention in polite society, much less boast about.

In her own way, the old lady was trying to do her best for him, but she had found it difficult to understand her own son, and his deviations from the Porter norm had been slight in comparison with those of his son. When the time came for Malcom to enter college, Grandmother Porter was at a total loss as to what to do. With his record, it was unlikely that any law school would take him unless he showed tremendous improvement in his pre-law courses. And unless that improvement was a general one, not only as far as his studies were concerned, but in his handling of his personal life, it would be commercial suicide to put him in any position of trust with Porter & Sons. It wasn't that he was dishonest; he simply couldn't be trusted to do anything properly. He had a tendency to follow his own whims and ignore everybody else.

The idea of his entering the clergy was never even considered.

It came almost as a relief to the old woman when Malcom announced that he was going to study physics, as his father had done.

The relief didn't last long. By the time Malcom was in his sophomore year, he was apparently convinced that his instructors were dunderheads to the last man. That, Elshawe thought, was probably not unusual among college students, but Malcom Porter made the mistake of telling them about it.

One of the professors with whom Elshawe had talked had said: "He acted as though he owned the college. That, I think, was what was his trouble in his studies; he wasn't really stupid, and he wasn't as lazy as some said, but he didn't want to be bothered with anything that he didn't enjoy. The experiments he liked, for instance, were the showy, spectacular ones. He built himself a Tesla coil, and a table with hidden AC electromagnets in it that would make a metal plate float in the air. But when it came to neucleonics, he was bored. Anything less than a thermonuclear bomb wasn't any fun."

The trouble was that he called his instructors stupid and dull for being interested in "commonplace stuff," and it infuriated him to be forced to study such "junk."

As a result, he managed to get

himself booted out of college toward the end of his junior year. And that was the end of his formal education.

Six months after that, his grandmother died. Although she had married into the Porter family, she was fiercely proud of the name; she had been born a Van Courtland, so she knew what family pride was. And the realization that Malcom was the last of the Porters—and a failure—was more than she could bear. The coronary attack she suffered should have been cured in a week, but the best medico-surgical techniques on Earth can't help a woman who doesn't want to live.

Her will showed exactly what she thought of Malcom Porter. The Porter holdings were placed in trust. Malcom was to have the earnings, but he had no voice whatever in control of the principal until he was fifty years of age.

Instead of being angry, Malcom was perfectly happy. He had an income that exceeded a million dollars before taxes, and didn't need to worry about the dull details of making money. He formed a small corporation of his own, Porter Research Associates, and financed it with his own money. It ran deep in the red, but Porter didn't mind; Porter Research Associates was a hobby, not a business, and running at a deficit saved him plenty in taxes.

By the time he was twenty-five, he was known as a crackpot. He had a motley crew of technicians and scientists working for him—some with Ph.D.'s, some with a trade-school education. The personnel turnover in that little group was on a par with the turnover of patients in a maternity ward, at least as far as genuine scientists were concerned. Porter concocted theories and hypotheses out of cobwebs and became furious with anyone who tried to tear them down. If evidence came up that would tend to show that one of his pet theories was utter hogwash, he'd come up with an *ad hoc* explanation which showed that this particular bit of evidence was an exception. He insisted that "the basis of science lies in the experimental evidence, not in the pronouncements of authorities," which meant that any recourse to the theories of Einstein, Pauli, Dirac, Bohr, or Fermi was as silly as quoting Aristotle, Plato, or St. Thomas Aquinas. The only authority he would accept was Malcom Porter.

Nobody who had had any training in science could work long with a man like that, even if the pay had been high, which it wasn't. The only people who could stick with him were the skilled workers—the welders, tool-and-die men, electricians, and junior engineers, who didn't care much about theories as long as they got the work done. They listened respectfully to what Porter had to say and then built the gadgets he told them to build. If the gadgets didn't work the way Porter expected them to, Porter would fuss and fidget with them until he got tired of them, then he would junk them and try something else. He never blamed a tech-

nician who had followed orders. Since the salaries he paid were proportional to the man's "ability and loyalty"—judged, of course, by Porter's own standards—he soon had a group of technician-artisans who knew that their personal security rested with Malcom Porter, and that personal loyalty was more important than the ability to utilize the scientific method.

Not everything that Porter had done was a one-hundred-per cent failure. He had managed to come up with a few basic improvements, patented them, and licensed them out to various manufacturers. But these were purely an accidental by-product. Malcom Porter was interested in "basic research" and not much else, it seemed.

He had written papers and books, but they had been uniformly rejected by the scientific journals, and those he had had published himself were on a par with the writings of Immanuel Velikovsky and George Adamski.

And now he was going to shoot a rocket—or whatever it was—to the moon. Well, Elshawe thought, if it went off as scheduled, it would at least be worth watching. Elshawe was a rocket buff; he'd watched a dozen or more moon shots in his life —everything from the automatic supply-carriers to the three-man passenger rockets that added to the personnel of Moon Base One—and he never tired of watching the bellowing monsters climb up skywards on their white-hot pillars of flame.

And if nothing happened, Elshawe decided, he'd at least get a laugh out of the whole episode.

After nearly two hours of driving, Bill Rodriguez finally turned off the main road onto an asphalt road that climbed steeply into the pine forest that surrounded it. A sign said: *Double Horseshoe Ranch—Private Road—No Trespassing.*

Elshawe had always thought of a ranch as a huge spread of flat prairie land full of cattle and gun-toting cowpokes on horseback; a mountainside full of sheep just didn't fit into that picture.

After a half mile or so, the station wagon came to a high metal-mesh fence that blocked the road. On the big gate, another sign proclaimed that the area beyond was private property and that trespassers would be prosecuted.

Bill Rodriguez stopped the car, got out, and walked over to the gate. He pressed a button in one of the metal gateposts and said, "Ed? This's Bill. I got Mr. Skinner and that New York reporter with me."

After a slight pause, there was a metallic click, and the gate swung open. Rodriguez came back to the car, got in, and drove on through the gate. Elshawe twisted his head to watch the big gate swing shut behind them.

After another ten minutes, Rodriguez swung off the road onto another side road, and ten minutes after that the station wagon went over a small rise and headed down into a

small valley. In the middle of it, shining like bright aluminum in the sun, was a vessel.

Now I know Porter is nuts, Elshawe thought wryly.

Because the vessel, whatever it was, was parallel to the ground, looking like the fuselage of a stratojet, minus wings and tail, sitting on its landing gear. Nowhere was there any sign of a launching pad, with its gantries and cranes and jet baffles. Nor was there any sign of a rocket motor on the vessel itself.

As the station wagon approached the cluster of buildings a hundred yards this side of the machine, Elshawe realized with shock that the thing *was* a stripped-down stratojet —an old Grumman *Supernova, circa* 1970.

"Well, Elijah got there by sitting in an iron chair and throwing a magnet out in front of himself," Elshawe said, "so what the hell."

"What?" Rodriguez asked blankly.

"Nothing; just thinking out loud. Sorry."

Behind Elshawe, Mr. Skinner chuckled softly, but said nothing.

When the station wagon pulled up next to one of the cluster of white prefab buildings, Malcom Porter himself stepped out of the wide door and walked toward them.

Elshawe recognized the man from his pictures—tall, wide-shouldered, dark-haired, and almost handsome, he didn't look much like a wild-eyed crackpot. He greeted Rodriguez and Skinner rather peremptorily, but he smiled broadly and held out his hand to Elshawe.

"Mr. Elshawe? I'm Malcom Porter." His grip was firm and friendly. "I'm glad to see you. Glad you could make it."

"Glad to be here, Dr. Porter," Elshawe said in his best manner. "It's quite a privilege." He knew that Porter liked to be called "Doctor"; all his subordinates called him that.

But, surprisingly, Porter said: "Not 'Doctor,' Mr. Elshawe; just 'Mister.' My boys like to call me 'Doctor,' but it's sort of a nickname. I don't have a degree, and I don't claim one. I don't want the public thinking I'm claiming to be something I'm not."

"I understand, Mr. Porter."

Bill Rodriguez's voice broke in. "Where do you want me to put all this stuff, Doc?" He had unloaded Elshawe's baggage from the station wagon and set it carefully on the ground. Skinner picked up his single suitcase and looked at Porter inquiringly.

"My usual room, Malcom?"

"Yeah. Sure, Sam; sure." As Skinner walked off toward one of the other buildings, Porter said: "Quite a load of baggage you have there, Mr. Elshawe. Recording equipment?"

"Most of it," the reporter admitted. "Recording TV cameras, 16mm movie cameras, tape recorders, 35mm still cameras—the works. I wanted to get good coverage, and if you've got any men that you won't be using during the takeoff, I'd like to borrow

them to help me operate this stuff."

"Certainly; certainly. Come on, Bill, let's get this stuff over to Mr. Elshawe's suite."

The suite consisted of three rooms, all very nicely appointed for a place as far out in the wilderness as this. When Elshawe got his equipment stowed away, Porter invited him to come out and take a look at his pride and joy.

"The first real spaceship, Elshawe," he said energetically. "The first real spaceship. The rocket is no more a spaceship than a rowboat is an ocean-going vessel." He gestured toward the sleek, shining, metal ship. "Of course, it's only a pilot model, you might say. I don't have hundreds of millions of dollars to spend; I had to make do with what I could afford. That's an old Grumman *Supernova* stratojet. I got it fairly cheap because I told 'em I didn't want the engines or the wings or the tail assembly.

"But she'll do the job, all right. Isn't she a beauty?"

Elshawe had his small pocket recorder going; he might as well get all this down. "Mr. Porter," he asked carefully, "just how does this vessel propel itself? I understand that, at the trial, it was said that you claimed it was an antigravity device, but that you denied it."

"Those idiots!" Porter exploded angrily. "Nobody understood what I was talking about because they wouldn't listen! Antigravity! *Pfui!* When they learned how to harness electricity, did they call it anti-electricity? When they built the first atomic reactor, did they call it anti-atomic energy? A rocket works against gravity, but they don't call *that* antigravity, do they? My device works *with* gravity, not against it."

"What sort of device is it?" Elshawe asked.

"I call it the Gravito-Inertial Differential Polarizer," Porter said importantly.

Elshawe was trying to frame his next question when Porter said: "I know the name doesn't tell you much, but then, names never do, do they? You know what a transformer does, but what does the name by itself convey? Nothing, unless you know what it does in the first place. A cyclotron cycles something, but what? A broadcaster casts something abroad—what? And how?"

"I see. And the 'how' and 'what' is your secret, eh?"

"Partly. I can give you a little information, though. Suppose there were only one planet in all space, and you were standing on its surface. Could you tell if the planet were spinning or not? And, if so, how fast? Sure you could; you could measure the so-called centrifugal force. The same thing goes for a proton or electron or neutron or even a neutrino. But, if it *is* spinning, what is the spin relative to? To the particle itself? That's obvious nonsense. Therefore, what is commonly called 'inertia' is as much a property of so-called 'empty space' as it is a property of matter. My device simply

utilizes spatial inertia by polarizing it against the matter inertia of the ship, that's all."

"Hm-m-m," said Elshawe. As far as his own knowledge of science went, that statement made no sense whatever. But the man's manner was persuasive. Talking to him, Elshawe began to have the feeling that Porter not only knew what he was talking about, but could actually do what he said he was going to do.

"What's that?" Porter asked sharply, looking up into the sky.

Elshawe followed his gaze. "That" was a Cadillac aircar coming over a ridge in the distance, its fans making an ever-louder throaty hum as it approached. It settled down to an altitude of three feet as it neared, and floated toward them on its cushion of air. On its side, Elshawe could see the words, UNITED STATES GOVERNMENT, and beneath that, in smaller letters, *Civil Aeronautics Authority.*

"Now what?" Porter muttered softly. "I haven't notified anyone of my intentions yet—not officially."

"Sometimes those boys don't wait for official notification," Elshawe said.

Porter glanced at him, his eyes narrowed. "You didn't say anything, did you?"

"Look, Mr. Porter, I don't play that way," Elshawe said tightly. "As far as I'm concerned, this is your show; I'm just here to get the story. You did us a favor by giving us advance notice; why should we louse up your show for you?"

"Sorry," Porter said brusquely. "Well, let's make a good show of it."

The CAA aircar slowed to a halt, its fans died, and it settled to its wheels.

Two neatly dressed, middle-aged men climbed out. Both were carrying brief cases. Porter walked briskly toward them, a warm smile on his face; Elshawe tagged along behind. The CAA men returned Porter's smile with smiles that could only be called polite and businesslike.

Porter performed the introductions, and the two men identified themselves as Mr. Granby and Mr. Feldstein, of the Civil Aeronautics Authority.

"Can I help you, gentlemen?" Porter asked.

Granby, who was somewhat shorter, fatter, and balder than his partner, opened his brief case. "We're just here on a routine check, Mr. Porter. If you can give us a little information . . .?" He let the half-question hang in the air as he took a sheaf of papers from his brief case.

"Anything I can do to help," Porter said.

Granby, looking at the papers, said: "In 1979, I believe you purchased a Grumman *Supernova* jet powered aircraft from Trans-American Airlines? Is that correct?"

"That is correct," Porter agreed.

Granby handed one of the papers to Porter. "That is a copy of the registration certificate. Is the registration number the same as it is on your copy?"

"I believe so," Porter said, looking at the number. "Yes, I'm sure it is."

Granby nodded briskly. "According to our records, the machine was sold as scrap. That is to say, it was not in an airworthy condition. It was, in fact, sold without the engines. Is that correct?"

"Correct."

"May I ask if you still own the machine in question?"

Porter gave the man a look that accused Granby of being stupid or blind or both. He pointed to the hulking fuselage of the giant aircraft. "There it is."

Granby and Feldstein both turned to look at it as though they had never noticed it before. "Ah, yes," Granby said, turning back. "Well, that's about all there is to it." He looked at his partner. "It's obvious that there's no violation here, eh, Feldstein?"

"Quite," said Feldstein in a staccato voice.

"Violation?" Porter asked. "What violation?"

"Well, nothing, really," Granby said, deprecatingly. "Just routine, as I said. People have been known to buy aircraft as scrap and then repair them and re-outfit them."

"Is that illegal?" Porter asked.

"No, no," said Granby hastily. "Of course not. But any ship so re-outfitted and repaired must pass CAA inspection before it can leave the ground, you understand. So we keep an eye on such transactions to make sure that the law isn't violated."

"After three years?" Porter asked blandly.

"Well . . . ah . . . well . . . you know how it is," Granby said nervously. "These things take time. Sometimes . . . due to . . . clerical error, we overlook a case now and then." He glanced at his partner, then quickly looked back at Porter.

"As a matter of fact, Mr. Porter," Feldstein said in a flat, cold voice, "in view of your record, we felt that the investigation at this time was advisable. You bought a scrap missile and used it illegally. You can hardly blame us for looking into this matter."

"No," said Porter. He had transferred his level gaze to the taller of the two men, since it had suddenly become evident that Feldstein, not Granby, was the stronger of the two.

"However," Feldstein went on, "I'm glad to see that we have no cause for alarm. You're obviously not fitting that up as an aircraft. By the way—just out of curiosity—what *are* you doing with it?" He turned around to look at the big fuselage again.

Porter sighed. "I had intended to hold off on this for a few days, but I might as well let the cat out now. I intend to take off in that ship this week end."

Granby's eyes opened wide, and Feldstein spun around as though someone had jabbed him with a needle. *"What?"*

Porter simply repeated what he had said. "I had intended to make application to the Space Force for permission to test it," he added.

Feldstein looked at him blankly for a moment.

Then: "The *Space* Force? Mr. Porter, civilian aircraft come under the jurisdiction of the CAA."

"How's he going to fly it?" Granby asked. "No engines, no wings, no control surfaces. It's silly."

"Rocket motors in the rear, of course," said Feldstein. "He's converted the thing into a rocket."

"But the tail is closed," Granby objected. "There's no rocket orifice."

"Dummy cover, I imagine," Feldstein said. "Right, Mr. Porter?"

"Wrong," said Porter angrily. "The motive power is supplied by a mechanism of my own devising! It has nothing to do with rockets! It's as superior to rocket power as the electric motor is to the steam engine!"

Feldstein and Granby glanced at each other, and an almost identical expression of superior smugness grew over their features. Feldstein looked back at Porter and said, "Mr. Porter, I assure you that it doesn't matter what you're using to lift that thing. You could be using dynamite for all I care. The law says that it can't leave the ground unless it's airworthy. Without wings or control surfaces, it is obviously not airworthy. If it is not a rocket device, then it comes under the jurisdiction of the Civil Aeronautics Authority, and if you try to take off without our permission, you'll go to jail.

"If it *is* a rocket device, then it

will be up to the Space Force to inspect it before take-off to make sure it is not dangerous.

"I might remind you, Mr. Porter, that you are on parole. You still have three years to serve on your last conviction. I wouldn't play around with rockets any more if I were you."

Porter blew up. "Listen, you! I'm not going to be pushed around by you or anyone else! I know better than you do what Alcatraz is like, and I'm not going back there if I can help it. This country is still Constitutionally a democracy, not a bureaucracy, and I'm going to see to it that I get to exercise my rights!

"I've invented something that's as radically new as . . . as . . . as the Law of Gravity was in the Seventeenth Century! And I'm going to get recognition for it, understand me?" He gestured furiously toward the fuselage of the old *Supernova.* "That ship is not only airworthy, but *space*-worthy! And it's a thousand times safer and a thousand times better than any rocket will ever be!

"For your information, Mister Smug-Face, I've already flown her!"

Porter stopped, took a deep breath, compressed his lips, and then said, in a lower, somewhat calmer tone, "Know what she'll do? That baby will hang in the air just like your aircar, there—and without benefit of those outmoded, power-wasting blower fans, too.

"Now, understand me, Mr. Feldstein: I'm not going to break any laws unless I have to. You and all your bureaucrat friends will have a chance to give me an O.K. on this test. But I warn you, brother—*I'm going to take that ship up!*"

Feldstein's jaw muscles had tightened at Porter's tone when he began, but he had relaxed by the time the millionaire had finished, and was even managing to look snugly tolerant. Elshawe had thumbed the button on his minirecorder when the conversation had begun, and he was chuckling mentally at the thought of what was going down on the thin, magnetite-impregnated, plastic thread that was hissing past the recording head.

Feldstein said: "Mr. Porter, we came here to remind you of the law, nothing more. If you intend to abide by the law, fine and dandy. If not, you'll go back to prison.

"That ship is not airworthy, and—"

"How do you know it isn't?" Porter roared.

"By inspection, Mr. Porter; by inspection." Feldstein looked exasperated. "We have certain standards to go by, and an aircraft without wings or control surfaces simply doesn't come up to those standards, that's all. Even a rocket has to have stabilizing fins." He paused and zipped open his brief case.

"In view of your attitude," he said, pulling out a paper, "I'm afraid I shall have to take official steps. This is to notify you that the aircraft in question has been inspected and found to be not airworthy. Since—"

"Wait a minute!" Porter snapped.

"Who are you to say so? How would you know?"

"I happen to be an officer of the CAA," said Feldstein, obviously trying to control his temper. "I also happen to be a graduate aeronautical engineer. If you wish, I will give the . . . the . . . aircraft a thorough inspection, inside and out, and—"

"Oh, no!" said Porter. His voice and his manner had suddenly become very gentle. "I don't think that would do much good, do you?"

"What do you mean?"

"I mean that you'd condemn the ship, no matter what you found inside. You couldn't O.K. a ship without airfoils, could you?"

"Of course not," said Feldstein, "that's obvious, in the face of—"

"All right, then give me the notification and forget the rest of the inspection." Porter held out his hand.

Feldstein hesitated. "Well, now, without a complete inspection—"

Again Porter interrupted. "You're not going to get a complete inspection, Buster," he said with a wolfish grin. "Either serve that paper or get off my back."

Feldstein slammed the paper into Porter's hand. "That's your official notification! If necessary, Mr. Porter, we will be back with a Federal marshal! Good day, Mr. Porter. Let's go, Granby."

The two of them marched back to their aircar and climbed inside. The car lifted with a roar of blowers and headed back over the mountains toward Albuquerque.

But long before they were out of sight over the ridge, Malcom Porter had turned on his heel and started back toward the cluster of buildings. He was swearing vilely in a rumbling monotone, and had apparently forgotten all about Elshawe.

The reporter followed in silence for a dozen paces, then he asked: "What's your next step, Mr. Porter?"

Porter came to an abrupt stop, turned, and looked at Elshawe. "I'm going to phone General Fitzsimmons in Washington! I'm—" He stopped, scowling. "No, I guess I'd better phone my lawyer first. I'll find out what they can do and what they can't." Then he turned again and strode rapidly toward the nearest of the buildings.

Seventy-two hours later, Terry Elshawe was in Silver City, talking to his boss over a long-distance line.

". . . And that's the way it lines up, Ole. The CAA won't clear his ship for take-off, and the Space Force won't either. And if he tries it without the O.K. of both of them, he'll be right back in Alcatraz."

"He hasn't violated his parole yet, though?" Winstein's voice came distantly.

"No." Elshawe cursed the fact that he couldn't get a vision connection with New York. "But, the way he's acting, he's likely to. He's furious."

"Why wouldn't he let the Space Force officers look over his ship?" Winstein asked. "I still don't see

how that would have hurt him if he's really got something."

"It's on the recording I sent you," Elshawe said.

"I haven't played it yet," Winstein said. "Brief me."

"He wouldn't let the Space Force men look at his engine or whatever it is because he doesn't trust them," Elshawe said. "He claims to have this new drive, but he doesn't want anyone to go nosing around it. The Space Force colonel . . . what's his name? . . . Manetti, that's it. Manetti asked Porter why, if he had a new invention, he hadn't patented it. Porter said that he wasn't going to patent it because that would make it available to every Tom, Dick, and Harry—his very words—who wanted to build it. Porter insists that, since it's impossible to patent the discovery of a new natural law, he isn't going to give away his genius for nothing. He said that Enrico Fermi was the prime example of what happened when the Government got hold of something like that when the individual couldn't argue."

"Fermi?" Winstein asked puzzledly. "Wasn't he a physicist or something, back in the Forties?"

"Right. He's the boy who figured out how to make the atomic bomb practical. But the United States Government latched onto it, and it took him years to get any compensation. He never did get the money that he was entitled to.

"Porter says he wants to make sure that the same thing doesn't happen to him. He wants to prove that he's got something and then let the Government pay him what it's worth and give him the recognition he deserves. He says he has discovered a new natural law and devised a machine that utilizes that law. He isn't going to let go of his invention until he gets credit for everything."

There was a long silence from the other end. After a minute, Elshawe said: "Ole? You there?"

"Oh. Yeah . . . sure. Just thinking. Terry, what do you think of this whole thing? Does Porter have something?"

"Damned if I know. If I were in New York, I'd say he was a complete nut, but when I talk to him, I'm halfway convinced that he knows what he's talking about."

There was another long pause. This time, Elshawe waited. Finally, Oler Winstein said: "You think Porter's likely to do something drastic?"

"Looks like it. The CAA has already forbidden him to lift that ship. The Space Force flatly told him that he couldn't take off without permission, and they said he wouldn't get permission unless he let them look over his gizmo . . . whatever it is."

"And he refused?"

"Well, he did let Colonel Manetti look it over, but the colonel said that, whatever the drive principle was, it wouldn't operate a ship. He said the engines didn't make any sense. What it boils down to is that the CAA thinks Porter has rockets

in the ship, and the Space Force does, too. So they've both forbidden him to take off."

"*Are* there any rocket motors in the ship?" Winstein asked.

"Not as far as I can see," Elshawe said. "He's got two big atomic-powered DC generators aboard—says they have to be DC to avoid electromagnetic effects. But the drive engines don't make any more sense to me than they do to Colonel Manetti."

Another pause. Then: "O.K., Terry; you stick with it. If Porter tries to buck the Government, we've got a hell of a story if his gadget works the way he says it does. If it doesn't—which is more likely—then we can still get a story when they haul him back to the Bastille."

"Check-check. I'll call you if anything happens."

He hung up and stepped out of the phone booth into the lobby of the Murray Hotel. Across the lobby, a glowing sign said *cocktail lounge* in lower-case script.

He decided that a tall cool one wouldn't hurt him any on a day like this and ambled over, fumbling in his pockets for pipe, tobacco pouch, and other paraphernalia as he went. He pushed open the door, spotted a stool at the bar of the dimly-lit room, went over to it and sat down.

He ordered his drink and had no sooner finished than the man to his left said, "Good afternoon, Mr. Elshawe."

The reporter turned his head toward his neighbor. "Oh, hello, Mr. Skinner. I didn't know you'd come to town."

"I came in somewhat earlier. Couple, three hours ago." His voice had the careful, measured steadiness of a man who has had a little too much to drink and is determined not to show it. That surprised Elshawe a little; Skinner had struck him as a middle-aged accountant or maybe a high school teacher—the mild kind of man who doesn't drink at all, much less take a few too many.

"I'm going to hire a 'copter and fly back," Elshawe said. "You're welcome if you want to come along."

Skinner shook his head solemnly. "No. Thank you. I'm going back to Los Angeles this afternoon. I'm just killing time, waiting for the local plane to El Paso."

"Oh? Well, I hope you have a good trip." Elshawe had been under the impression that Skinner had come to New Mexico solely to see the test of Porter's ship. He had wondered before how the man fitted into the picture, and now he was wondering why Skinner was leaving. He decided he might as well try to find out. "I guess you're disappointed because the test has been called off," he said casually.

"Called off? Hah. No such thing," Skinner said. "Not by a long shot. Not Porter. He'll take the thing up, and if the Army doesn't shoot him down, the CAA will see to it that he's taken back to prison. But that won't stop him. Malcom Porter is determined to go down in history as a great scientist, and nothing is

going to stop him if he can help it."

"You think his spaceship will work, then?"

"Work? Sure it'll work. It worked in '79; it'll work now. The way that drive is built, it can't help but work. I just don't want to stick around and watch him get in trouble again, that's all."

Elshawe frowned. All the time that Porter had been in prison, his technicians had been getting together the stuff to build the so-called "spaceship," but none of them knew how it was put together or how it worked. Only Porter knew that, and he'd put it together after he'd been released on parole.

But if that was so, how come Skinner, who didn't even work for Porter, was so knowledgeable about the drive? Or was that liquor talking?

"Did you help him build it?" the reporter asked smoothly.

"*Help* him build it? Why, I—" Then Skinner stopped abruptly. "Why, no," he said after a moment. "No. I don't know anything about it, really. I just know that it worked in '79, that's all." He finished his drink and got off his stool. "Well, I've got to be going. Nice talking to you. Hope I see you again sometime."

"Sure. So long, Mr. Skinner." He watched the man leave the bar.

Then he finished his own drink and went back into the lobby and got a phone. Ten minutes later, a friend of his who was a detective on the Los Angeles police force had promised to check into Mr. Samuel Skinner. Elshawe particularly wanted to know what he had been doing in the past three years and very especially what he had been doing in the past year. The cop said he'd find out. There was probably nothing to it, Elshawe reflected, but a reporter who doesn't follow up accidentally dropped hints isn't much of a reporter.

He came out of the phone booth, fired up his pipe again, and strolled back to the bar for one more drink before he went back to Porter's ranch.

Malcolm Porter took one of the darts from the half dozen he held in his left hand and hurled it viciously at the target board hung on the far wall of the room.

Thunk!

"Four ring at six o'clock," he said in a tight voice.

Thunk! Thunk! Thunk! Thunk! Thunk!

The other five darts followed in rapid succession. As he threw each one, Porter snapped out a word. "They . . . can't . . . stop . . . Malcom . . . Porter!" He glared at the board "Two bull's-eyes; three fours, and a three. Twenty-five points. You owe me a quarter, Elshawe."

The reporter handed him a coin. "Two bits it is. What can you do, Porter? They've got you sewed up tight. If you try to take off, they'll cart you right back to The Rock—if the Army doesn't shoot you down first. Do you want to spend the next ten years engrossed in the scenic beauties of San Francisco Bay?"

"No. And I won't, either."

"Not if the Army gets you. I can see the epitaph now:

Malcom Porter, with vexation,
Thought he could defy the nation.
He shot for space with great elation—
Now he's dust and radiation.

Beneath it, they'll engrave a spaceship argent with A-bombs rampant on a field sable."

Porter didn't take offense. He grinned. "What are you griping about? It would make a great story."

"Sure it would," Elshawe agreed. "But not for me. I don't write the obituary column."

"You know what I like about you, Elshawe?"

"Sure. I lose dart games to you."

"That, yes. But you really sound worried. That means two things. One: You like me. Two: You believe that my ship actually will take off. That's more than any of those other reporters who have been prowling around and phoning in do."

Elshawe shrugged silently and puffed at his pipe. Malcom Porter's ego was showing through. He was wrong on two counts. Elshawe didn't like him; the man's arrogance and his inflated opinion of himself as a scientific genius didn't set well with the reporter. And Elshawe didn't really believe there was anything but a rocket motor in that hull outside. A new, more powerful kind of rocket perhaps—otherwise Porter wouldn't be trying to take a one-stage rocket to the Moon. But a rocket, nonetheless.

"I don't want to go back to prison," Porter continued, "but I'll risk that if I have to. But I won't risk death just yet. Don't worry; the Army won't know I'm even gone until I'm halfway to the Moon."

"Foo!" said Elshawe. "Every radar base from Albuquerque to the Mexican border has an antenna focused on the air above this ranch. The minute you get above those mountains, they'll have a fix on you, and a minute after that, they'll have you bracketed with Cobras.

"Why don't you let the Government inspectors look it over and give you an O.K.? What makes you think they're all out to steal your invention?"

"Oh, they won't *steal* it," Porter said bitterly. "Heaven's-to-Betsy *no!* But this invention of mine will mean that the United States of America will be in complete control of the planets and the space between. When the Government wants a piece of property, they try to buy it at their price; if they can't do that, they condemn it and pay the owner what they think it's worth—not what the owner thinks it's worth. The same thing applies here; they'd give me what they thought I ought to have—in ten years or so. Look what happened to Fermi.

"No, Elshawe; when the Government comes begging to me for this invention, they can have it—on *my* terms."

"Going to keep it a secret, eh? You can't keep a thing like that secret. Look what happeend with atomic energy after World War Two. We kept it a secret from the Russians,

didn't we? Fine lot of good that did us. As soon as they knew it was possible, they went to work on it. Nature answers any questions you ask her if you ask her the right way. As soon as the Government sees that your spaceship works, they'll put some of their bright physicists to work on it, and you'll be in the same position as you would have been if you'd showed it to them in the first place. Why risk your neck?"

Porter shook his head. "The analogy isn't valid. Suppose someone had invented the A-bomb in 1810. It would have been a perfectly safe secret because there wasn't a scientist on Earth who included such a thing as atomic energy in his philosophy. And, believe me, this drive of mine is just as far ahead of contemporary scientific philosophy as atomic energy was ahead of Napoleon's scientists.

"Suppose I told you that the fuel my ship uses is a gas lighter than hydrogen. It isn't, but suppose I told you so. Do you think any scientist today could figure out how it worked? No. They *know* that there's no such thing as a gas with a lighter atomic weight than hydrogen. They know it so well that they wouldn't even bother to consider the idea.

"My invention is so far ahead of present-day scientific thought that no scientists except myself could have even considered the idea."

"O.K.; O.K.," Elshawe said. "So you're going to get yourself shot down to prove your point."

Porter grinned lopsidedly. "Not at all. You're still thinking in terms of a rocket. Sure—if I used a rocket, they'd knock me down fast, just as soon as I lifted above the mountains. But I don't have to do that. All I have to do is get a few feet of altitude and hug the ground all the way to the Pacific coast. Once I get out in the middle of the Pacific, I can take off straight up without being bothered at all."

"All right. If your machine will do it," the reporter said, trying to hide his skepticism.

"You still think I've got some kind of rocket, don't you?" Porter asked accusingly. He paused a moment, then, as if making a sudden decision, he said: "Look, Elshawe, I trust you. I'm going to show you the inside of that ship. I won't show you my engines, but I *will* prove to you that there are no rocket motors in her. That way, when you write up the story, you'll be able to say that you have first-hand knowledge of that fact. O.K.?"

"It's up to you," the reporter said. "I'd like to see it."

"Come along," said Malcom Porter.

Elshawe followed Porter out to the field, feeling rather grateful that he was getting something to work on. They walked across the field, past the two gun-toting men in Levis that Porter had guarding the ship. Overhead, the stars were shining brightly through the thin mountain air. Elshawe glanced at his wrist watch. It was a little after ten p.m.

He helped Porter wheel the ramp

up to the door of the ship and then followed him up the steps. Porter unlocked the door and went inside. The Grumman had been built to cruise in the high stratosphere, so it was as air-tight as a submarine.

Porter switched on the lights. "Go on in."

The reporter stepped into the cabin of the ship and looked around. It had been rebuilt, all right; it didn't look anything like the inside of a normal stratojet.

"Elshawe."

"Yeah?" The reporter turned to look at Porter, who was standing a little behind him. He didn't even see the fist that arced upward and smashed into his jaw. All he saw was a blaze of light, followed by darkness.

The next thing he knew, something was stinging in his nostrils. He jerked his head aside, coughing. The smell came again. Ammonia.

"Wake up, Elshawe," Porter was saying. "Have another whiff of these smelling salts and you'll feel better."

Elshawe opened his eyes and looked at the bigger man. "I'm awake. Take that stuff away. What's the idea of slugging me?"

"I was afraid you might not come willingly," Porter said apologetically. "I needed a witness, and I figured you'd do better than anyone else."

Elshawe tried to move and found that he was tied to the seat and strapped in with a safety belt. "What's this for?" he asked angrily. His jaw still hurt.

"I'll take that stuff off in a few minutes. I know I can trust you, but I want you to remember that I'm the only one who can pilot this ship. If you try anything funny, neither one of us will get back alive. I'll let you go as soon as we get up to three hundred miles."

Elshawe stared at him. "Where are we?"

"Heading out toward mid-Pacific. I headed south, to Mexico, first. We're over open water now, headed toward Baja California, so I put on the autopilot. As soon as we get out over the ocean, we can really make time. You can watch the sun come up in the west."

"And then?" Elshawe felt dazed.

"And then we head straight up. For empty space."

Elshawe closed his eyes again. He didn't even want to think about it.

". . . As you no doubt heard," Terrence Elshawe dictated into the phone, "Malcom Porter made good his threat to take a spaceship of his own devising to the Moon. Ham radios all over North America picked up his speech, which was made by spreading the beam from an eighty-foot diameter parabolic reflector and aiming it at Earth from a hundred thousand miles out. It was a collapsible reflector, made of thin foil, like the ones used on space stations. Paragraph.

"He announced that the trip was made with the co-operation of the United States Space Force, and that it represented a major breakthrough in the conquest of space. He—"

"Just a sec," Winstein's voice

broke in. "Is that the truth? Was he really working with the Space Force?"

"Hell, no," said Elshawe. "But they'll have to claim he was now. Let me go on."

"Shoot."

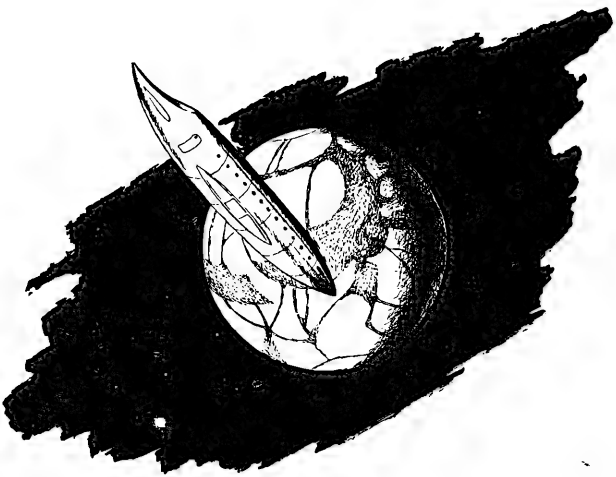
". . . He also beamed a message to the men on Moon Base One, telling them that from now on they would be able to commute back and forth from Luna to Earth, just as simply as flying from New York to Detroit. Paragraph.

"What followed was even more astounding. At tremendous acceleration, Malcom Porter and Terrence Elshawe, your reporter, headed for Mars. Inside Porter's ship, there is no feeling of acceleration except for a steady, one-gee pull which makes the passenger feel as though he is on an ordinary airplane, even though the spaceship may be accelerating at more than a hundred gravities. Paragraph.

"Porter's ship circled Mars, taking photographs of the Red Planet—the first close-ups of Mars to be seen by the human race. Then, at the same tremendous rate of speed, Porter's ship returned to Earth. The entire trip took less than thirty-six hours. According to Porter, improved ships should be able to cut that time down considerably. Paragraph."

"Have you got those pics?" Winstein cut in.

"Sure. Porter gave me an exclusive in return for socking me. It was



worth it. Remember back in the Twenties, when the newspapermen talked about a scoop? Well, we've got the biggest scoop of the century."

"Maybe," said Winstein. "The Government hasn't made any announcement yet. Where's Porter?"

"Under arrest, where'd you think? After announcing that he would land on his New Mexico ranch, he did just that. As soon as he stepped out, a couple of dozen Government agents grabbed him. Violation of parole—he left the state without notifying his parole officer. But they couldn't touch me, and they knew it.

"Here's another bit of news for your personal information. A bomb went off inside the ship after it landed and blew the drive to smithereens. The only information is inside Porter's head. He's got the Government where the short hair grows."

"Looks like it. See here, Terry; you get all the information you can and be back here by Saturday. You're going to go on the Weekend Report."

"Me? I'm no actor. Let Maxon handle it."

"No. This is hot. You're an eyewitness. Maxon will interview you. Understand?"

"O.K.; you're the boss, Ole. Anything else?"

"Not right now, but if anything more comes up, call in."

"Right. 'Bye." He hung up and leaned back in his chair, cocking his feet up on the desk. It was Malcom Porter's desk and Malcom Porter's chair. He was sitting in the Big Man's office, just as though he owned it. His jaw still hurt a little, but he loved every ache of it. It was hard to remember that he had ever been angry with Porter.

Just before they had landed, Porter had said: "They'll arrest me, of course. I knew that when I left. But I think I can get out of it. There will be various kinds of Government agents all over the place, but they won't find anything. I've burned all my notebooks.

"I'll instruct my attorney that you're to have free run of the place so that you can call in your story."

The phone rang. Elshawe grabbed up the receiver and said: "Malcom Porter's residence." He wished that they had visiphones out in the country; he missed seeing the face of the person he was talking to.

"Let me talk to Mr. Terrence Elshawe, please," said the voice at the other end. "This is Detective Lieutenant Martin of the Los Angeles Police Department."

"This is me, Marty."

"Good! Boy, have I had trouble getting to you! I had to make it an official call before the phone company would put the call through. How does it feel to be notorious?"

"Great. What's new?"

"I got the dope on that Skinner fellow. I suppose you still want it? Or has success gone to your head?"

Elshawe had almost forgotten about Skinner. "Shoot," he said.

The police officer rattled off Samuel Skinner's vital statistics—age, sex, date and place of birth, and so on. Then: "He lived in New York until 1977. Taught science for fifteen years at a prep school there. He—"

"Wait a second," Elshawe interrupted. "When was he born? Repeat that."

"March fourth, nineteen-thirty."

"Fifty-three," Elshawe said, musingly. "Older than he looks. O.K.; go on."

"He retired in '77 and came to L.A. to live. He—"

"Retired at the age of forty-seven?" Elshawe asked incredulously.

"That's right. Not on a teacher's pension, though. He's got some kind of annuity from a New York life insurance company. Pays pretty good, too. He gets a check for two thousand dollars on the third of every month. I checked with his bank on that. Nice, huh?"

"Very nice. Go on."

"He lives comfortably. No police record. Quiet type. One servant, a Chinese, lives with him. Sort of combination of valet and secretary.

"As far as we can tell, he has made four trips in the past three years. One in June of '79, one in June of '80, one in June of '81, and this year he made the fourth one. In '79, he went to Silver City, New Mexico. In '80 and '81, he went to Hawaii. This year, he went to Silver City again, Mean anything to you?"

"Not yet," Elshawe said. "Are you paying for this call, or is the City of Los Angeles footing the bill?"

"Neither. You are."

"Then shut up and let me think for a minute." After less than a minute, he said: "Martin, I want some more data on that guy. I'm willing to pay for it. Should I hire a private detective?"

"That's up to you. I can't take any money for it, naturally—but I'm willing to nose around a little more for you if I can. On the other hand, I can't put full time in on it. There's a reliable detective agency here in L.A.— Drake's the guy's name. Want me to get in touch with him?"

"I'd appreciate it. Don't tell him who wants the information or that it has any connection with Porter. Get—"

"Hold it, Terry . . . just a second. You know that if I uncover any indication of a crime, all bets are off. The information goes to my superiors, not to you."

"I know. But I don't think there's any crime involved. You work it from your end and send me the bills. O.K.?"

"Fair enough. What more do you want?"

Elshawe told him.

When the phone call had been completed, Elshawe sat back and made clouds of pipesmoke, which he stared at contemplatively. Then he made two calls to New York—one to his boss and another to a private detective agency he knew he could trust.

The Malcom Porter case quickly became a *cause célèbre*. Somebody goofed. Handled properly, the whole affair might have been hushed up; the Government would have gotten what it wanted, Porter would have gotten what *he* wanted, and everyone would have saved face. But some bureaucrat couldn't see beyond the outer surface of his spectacle lenses, and some other bureaucrat failed to stop the thing in time.

"Gall, gall, and bitter, bitter wormwood," said Oler Winstein, perching himself on the edge of Terry Elshawe's desk.

"You don't Gallic, bitter, wormy, or. wooden. What's up?"

"Got a call from Senator Tallifero. He wants to know if you'll consent to appear before the Joint Congressional Committee for Investigating Military Affairs. I get the feeling that if you say 'no,' they'll send a formal invitation—something on the order of a subpoena."

Elshawe sighed. "Oh, well. It's news, anyway. When do they want me to be in Washington?"

"Tomorrow. Meanwhile, Porter, of course, is under arrest and in close confinement. Confusion six ways from Sunday." He shook his head. "I don't understand why they just didn't pat him on the back, say they'd been working on this thing all along, and cover it up fast."

"Too many people involved," Elshawe said, putting his cold pipe in the huge ashtray on his desk. "The Civil Aeronautics crowd must have had a spotter up in those mountains; they had a warrant out for his arrest within an hour after we took off. They also notified the parole board, who put out an all-points bulletin immediately. The Army and the Air Force were furious because he'd evaded their radar net. Porter stepped on so many toes so hard that it was inevitable that one or more would yell before they realized it would be better to keep their mouths shut."

"Well, you get up there and tell your story, and I dare say he'll come out of it."

"Sure he will. They know he's got something, and they know they have to have it. But he's going to go through hell before they give it to him."

Winstein slid off the desk and stood up. "I hope so. He deserves it. By the way, it's too bad you couldn't get a story out of that Sam Skinner character."

"Yeah. But there's nothing to it. After all, even the FBI tried to find out if there was anyone at all besides Porter who might know anything about it. No luck. Not even the technicians who worked with him knew anything useful. Skinner didn't know anything at all." He told the lie with a perfectly straight face. He didn't like lying to Winstein, but there was no other way. He hoped he wouldn't have to lie to the Congressional Committee; perjury was not something he liked doing. The trouble was, if he told the truth, he'd be worse off than if he lied.

He took the plane that night for

Washington, and spent the next three days answering questions while he tried to keep his nerves under control. Not once did they even approach the area he wanted them to avoid.

On the plane back, he relaxed, closed his eyes, and, for the first time in days, allowed himself to think about Mr. Samuel Skinner.

The reports from the two detective agencies on the East and West Coasts hadn't made much sense separately, but together they added up to enough to have made it worth Elshawe's time to go to Los Angeles and tackle Samuel Skinner personally. He had called Skinner and made an appointment; Skinner had invited him out to his home.

It was a fairly big house, not too new, and it sat in the middle of a lot that was bigger than normal for land-hungry Los Angeles.

Elshawe ran through the scene mentally. He could see Skinner's mild face and hear his voice saying: "Come in, Mr. Elshawe."

They went into the living room, and Skinner waved him toward a chair. "Sit down. Want some coffee?"

"Thanks; I'd appreciate it." While Skinner made coffee, the reporter looked around the room. It wasn't overly showy, but it showed a sort of subdued wealth. It was obvious that Mr. Skinner wasn't lacking in comforts.

Skinner brought in the coffee and then sat down, facing Elshawe, in another chair. "Now," he said bluntly, "what was that remark you made on the phone about showing up Malcom Porter as a phony? I understood that you actually went to Mars on his ship. Don't you believe the evidence of your own senses?"

"I don't mean that kind of phony," Elshawe said. "And you know it. I'll come to the point. I know that Malcom Porter didn't invent the Gravito-Inertial Differential Polarizer. *You* did."

Skinner's eyes widened. "Where did you get that information?"

"I can't tell you my sources, Mr. Skinner. Not yet, anyhow. But I have enough information to tell me that you're the man. It wouldn't hold up in court, but, with the additional information you can give me, I think it will."

Skinner looked baffled, as if not knowing what to say next.

"Mr. Skinner," Elshawe went on, "a research reporter has to have a little of the crusader in him, and maybe I've got more than most. You've discovered one of the greatest things in history—or invented it, whatever you want to call it. You deserve to go down in history along with Newton, Watt, Roentgen, Edison, Einstein, Fermi, and all the rest.

"But somehow Malcom Porter stole your invention and he intends to take full credit for it. Oh, I know he's paid you plenty of money not to make any fuss, and he probably thinks you couldn't prove anything, anyway. But you don't have to be

satisfied with his conscience money any more. With the backing of Magnum Telenews, you can blow Mister Glory-hound Porter's phony setup wide open and take the credit you deserve."

Skinner didn't look at all the way Elshawe had expected. Instead, he frowned a little and said: "I'm glad you came, Mr. Elshawe. I didn't realize that there was enough evidence to connect me with his project." But he didn't look exactly overjoyed.

"Well," Elshawe said tentatively, "if you'll just answer a few questions—"

"Just a minute, Mr. Elshawe. Do you mind if I ask you a few questions first?"

"Go ahead."

Skinner leaned forward earnestly. "Mr. Elshawe, who deserves credit for an invention? Who deserves the money?"

"Why . . . why, the inventor, of course."

"The inventor? Or the man who gives it to humanity?"

"I . . . don't quite follow you."

He leaned back in his chair again. "Mr. Elshawe, when I invented the Polarizer, I hadn't the remotest idea of what I'd invented. I taught general science in the high school Malcom Porter went to, and I had a lab in my basement. Porter was a pretty bright boy, and he liked to come around to my lab and watch me putter around. I had made this gadget —it was a toy for children as far as I was concerned. I didn't have any idea of its worth. It was just a little gadget that hopped up into the air and floated down again. Cute, but worthless, except as a novelty. And it was too expensive to build it as a novelty. So I forgot about it.

"Years later, Porter came around to me and offered to buy it. I dug it out of the junk that was in my little workshop and sold it to him.

"A couple of years after that, he came back. He said that he'd invented something. After beating all around the bush, he finally admitted that his invention was a development of my little toy. He offered me a million dollars if I'd keep my mouth shut and forget all about the thing."

"And you accepted?" Elshawe asked incredulously.

"Certainly! I made him buy me a tax-paid annuity that pays me more than enough to get by on. I don't want wealth, Mr. Elshawe—just comfort. And that's why I gave it to him."

"I don't follow you."

"Let me tell you about Malcom Porter. He is one of that vast horde of people who want to be *someone*. They want to be respected and looked up to. But they either can't, or won't, take the time to learn the basics of the field they want to excel in. The beautiful girl who wants to be an actress without bothering to learn to act; the young man who wants to be a judge without going through law school, or be a general without studying military tactics; and Malcom Porter, the boy who wanted

to be a great scientist—but didn't want to take the trouble to learn science."

Elshawe nodded. He was thinking of the "artists" who splatter up clean canvas and call it "artistic self-expression." And the clodheads who write disconnected, meaningless prose and claim that it's free verse. The muddleminds who forget that Picasso learned to paint within the strict limits of classical art before he tried new methods, and that James Joyce learned to handle the English language well before he wrote "Finnegan's Wake."

"On the other hand," Skinner continued, "I am . . . well, rather a shy man. As soon as Malcom told me what the device would do when it was properly powered, I knew that there would be trouble. I am not a fighter, Mr. Elshawe. I have no desire to spend time in prison or be vilified in the news or called a crackpot by orthodox scientists.

"I don't want to fight Malcom's claim, Mr. Elshawe. Don't you see, he *deserves* the credit! In the first place, he recognized it for what it was. If he hadn't, Heaven only knows how long it would have been before someone rediscovered it. In the second place, he has fought and fought hard to give it to humanity. He has suffered in prison and spent millions of dollars to get the Polarizer into the hands of the United States Government. He has, in fact, worked harder and suffered more than if he'd taken the time and trouble to get a proper education. And it got him what he wanted; I doubt that he would have made a very good scientist, anyway.

"Porter deserves every bit of credit for the Polarizer. I am perfectly happy with the way things are working out."

Elshawe said: "But what if the FBI gets hold of the evidence I have?"

"That's why I have told you the truth, Mr. Elshawe," Skinner said earnestly. "I want you to destroy that evidence. I would deny flatly that I had anything to do with the Polarizer, in any case. And that would put an end to any inquiry because no one would believe that I would deny inventing something like that. But I would just as soon that the question never came up. I would rather that there be no whisper whatever of anything like that."

He paused for a moment, then, very carefully, he said: "Mr. Elshawe, you have intimated that the inventor of the Polarizer deserves some kind of reward. I assure you that the greatest reward you could give me would be to help me destroy all traces of any connection with the device. Will you do that, Mr. Elshawe?"

Elshawe just sat silently in the chair for long minutes, thinking. Skinner didn't interrupt; he simply waited patiently.

After about ten minutes, Elshawe put his pipe carefully on a nearby table and reached down to pick up his brief case. He handed it to Skinner.

"Here. It contains all the evidence I have. Including, I might say, the recording of our conversation here. Just take the tape out of the mini-recorder. A man like you deserves whatever reward he wants. Take it, Mr. Skinner."

"Thanks," said Skinner softly, taking the brief case.

And, on the plane winging back to New York from the Congressional investigation, Mr. Terrence Elshawe sighed softly. He was glad none of the senators had asked anything about Skinner, because he knew he would certainly have had to tell the truth.

And he knew, just as certainly, that he would have been in a great deal more hot water than Porter had been. Because Malcom Porter was going to become American Hero Number One, and Terry Elshawe would have ended up as the lying little sneak who had tried to destroy the reputation of the great Malcom Porter.

Which, all things considered, would have been a hell of a note.

THE END

IN TIMES TO COME

One of the really nice, self- contradictory and self-denying problems you can run into is that of shocking someone into doing something he's got to do to live . . . without letting him know he's been kicked in the pants. It's part of the psychological equivalent of a noiseless high-explosive.

Fortunately the differences between physical and psychological reality make this logically impossible feat quite simple; it just takes a little imagination. Simple enough—you multiply the problem by the square foot of minus one, turning the whole thing into a lie, and it's easy!

If that isn't quite as clear as it should be . . . try "The Lost Kafoozalum," by Pauline Ashwell. It's clear, isn't it, that an imaginary high-explosive would be perfectly soundless? And that an imaginary . . . well, look, let that not-so-dumb blonde of "Unwillingly To School" explain the whole thing in next month's lead novelette.

THE EDITOR.

A TRANSMUTATION OF MUDDLES

An experienced horse-trader, bargain-haggler, and general swapper has a very special talent for turning two headaches into one aspirin pill. . . .

By H. B. FYFE

Illustrated by Van Dongen

THE rugged little stellar scout ship flared down to the surface of Kappa Orionis VII about a mile from the aboriginal village. The pilot, Lieutenant Eric Haruhiku, scorched an open field, but pointed out to Louis Mayne that he had been careful to disturb neither woodland nor shoreline.

"The Kappans are touchy about those, Judge," he explained, "They fish a lot, as you'd guess from all these shallow seas, and they pick fruit in the forests; but they don't farm much."

"No use provoking trouble," Mayne approved. "It's a long way from Rigel."

"It's a longer way from Sol," said the pilot.

"Don't I know, boy! If it weren't, I'd be just another retired space captain, quietly struggling with my ranch on Rigel IX. As it is, to get the grant, I had to remain on call as an arbitrator."

"Somebody has to settle these things," said Haruhiku. "There's not much law way out here, except what the Space Force can apply. Well, if you'll excuse me, sir, I'll have them get out the helicopter and take us over to the village."

"Let me see that last message again, before you go," Mayne requested.

The pilot extracted a sheet from his clipboard and handed it to Mayne as he left. Mayne studied the text with little pleasure.

Terran Space Force headquarters

on Rigel IX wished to inform him that the long awaited envoy from Terra to Kappa Orionis VII not only had arrived but had departed two days behind Mayne.

It was hoped, the communication continued, that nothing would interfere with the desired objective of coming to some friendly agreement with the Kappans that would permit Terran use of the planet as a base for spaceships. The envoy, of course, was prepared to offer trade inducements and various other forms of help to the semi-civilized natives. Mayne was requested to lay whatever groundwork he could.

In my spare time, no doubt, he reflected. *I'm to settle this silly business any way at all—as long as the natives get their way. But has anybody told the government about insurance companies? If it costs money or a lawsuit, will they back me up?*

He felt himself to be in a ridiculous dilemma. The Kappans were reported to have seized a Terran spaceship as it landed to trade. Naturally, the captain had squawked for help. He claimed he had crashed; his insurance company thought otherwise; the Kappans seemed to have some entirely different idea in mind. Mayne had been summoned into action to render a decision, after the rough and ready system of these settlements on the surface of Terra's sphere of explored space.

Regretfully, he made his way now to the cubbyhole allowed him on the cramped scout, where he changed to a more formal tunic of a bright blue he hoped would look impressive to native eyes. By the time he was ready, the helicopter was waiting. He and Haruhiku entered, and the crewman at the controls took off for the scene of the dispute.

Arriving over the village, they hovered a few minutes while Haruhiku studied the lay of the land. The lieutenant had been to this world before, long enough to pick up some of the language and customs, so Mayne was content to follow his advice about landing a little way off from a spaceship that towered outside the village.

They came down about a hundred yards away, between a rutted sort of road and a long hut covered by a curved, thatched roof.

"They're expecting us," said Haruhiku, gesturing at the group before the hut.

It consisted of half a dozen humans and several of the Kappan natives. The latter, naturally, caught Mayne's eye first. The most imposing individual among them stood about five feet tall. The planet being of about the same mass as Terra, the Kappan probably weighed over two hundred and fifty pounds. He was a rugged biped with something saurian in his ancestry; for his skin was scaled, and bony plates grew into a low crown upon his long skull. His arms and legs were heavy and bowed, with joints obscured by thick muscles and loose skin. Mayne was struck by the fancy that the Kappan's color, a blend of brown and olive, was that of a small dragon who had achieved a good suntan. A yellow kilt was his main article

of attire, although he wore a few decorations of polished bone.

One of the Terrans stepped forward. He wore a semimilitary uniform.

"I suppose you're Louis Mayne?" he asked.

"Right," answered Mayne. "You would be Captain Voorhis, of the *Gemsbok?*"

"Check. This here is Eemakh. He's more or less chief of the village, or tribe, or whatever you wanna call it."

Mayne found his gaze sinking into catlike slits of jet in a pair of huge orange eyes shaded by massive brow ridges. The native made some statement in a clicking language that had a harsh, choppy rhythm.

"He welcomes you to Kappa," Haruhiku interpreted. "He hopes

the gods will not be displeased."

"What a warm welcome!" commented Mayne. "Have you been getting along that well, Captain Voorhis?"

"Just about," said the spacer. "One of my boys knows a few words. Rest of the time, we make signs. I gotta admit they ain't been too unfriendly."

"But they *have* seized your ship?"

"You're damn' right! That insurance guy they sent out don't see it that way though."

"Where is this representative of the Belt Insurance Company?" asked Mayne.

"Melin? His ship landed over on the other side of the village, about half a mile. He oughta be along soon. Must've seen you land."

Mayne wondered whether it were necessary to await the arrival of the insurance adjustor before asking any questions. To cover his hesitation, he turned to take his first good look at the hull of the *Gemsbok*.

"What do they think they're doing?" he demanded, staring.

The *Gemsbok* was—or had been—an ungraceful, thick starship on the verge of aging into scrap. Towering here between the village and the huge, bluish-green leaves of the Kappan forest, she was in the process of being transformed into a planet-bound object of a certain weird grace.

A framework was being constructed about the hull by a swarm of natives. They had reached halfway up the ship, which served as a central column. Much of the exterior appeared to be a network of strangely curved sections of wood that had been given a high polish. Mayne suspected the greenish highlights were reflections of the forest color.

"Bone," said Voorhis succinctly. "They collect it from things they catch in the sea. Main supports of timber, of course, built to fit the hull."

"The fish here grow very large," put in Haruhiku. "If you could call them fish, that is. I once saw them butchering what looked more like a dinosaur."

Mayne realized that the bone framework formed a sort of curtain wall. At the lower levels, some of the natives seemed to be experimenting with a coating of wet leaves which they were molding to the wall.

"They've soaked them in something they boil out of fish parts," his pilot explained. "Like the village roofs. When it dries, it's pretty hard, even waterproof. The stink never dries out."

"But what do they have in their bony little brains?" asked Mayne. "Just what is that mess supposed to be?"

"A temple, believe it or not," answered Voorhis. "They tell me I set her down on land sacred to the great god Meeg!"

Mayne looked at Haruhiku.

"Oh, come on, now! I came all the way from—" He stopped as he noticed the pilot's grave expression. "Oh! That sort of thing *could* be serious, I guess."

He imagined he had seen the chief,

Eemakh, come alert at the mention of the local god. Mayne sighed. It was going to be a long day.

He was saved for the time being by a hail from the direction of the village. A procession was approaching along the set of ruts between Mayne and the ship.

The place of honor appeared to be occupied by a two-wheeled cart of crude but massive design. Upon it rode a Kappan driver, two Kappans with spears and the look of official guards, and a Terran with a death-grip upon the side railing. A brace of truculent beasts of frighteningly saurian mien shuffled ponderously along in the loose harness. From time to time, one or the other would stumble over a turn in his rut and emit a menacing rumble as if he suspected his team mate of causing the misstep.

Before and behind this conveyance marched a guard of honor of Kappan warriors. The rear contingent kept close to the cart, but the advance party had opened a noticeable gap between themselves and the hulking team.

The procession halted, the soldier in charge raised his spear in salute to Eemakh, and the shaken Terran was assisted to dismount. He introduced himself to Mayne as Robert Melin.

"Let's go over to the hut they made for us an' sit down," suggested Voorhis.

Melin, a tall, gloomy blond whose civilian suit seemed a trifle formal for the surroundings, acceded gratefully. He mopped the dust from his long face and watched the cart being turned around.

The procession moved off in the direction of the village, the advance guard stepping out especially smartly, and Mayne began to get his conference arranged.

He learned that the evicted crew of the *Gemsbok* had been living in the hut nearby. Before it stood a long table with benches, all evidently knocked together from recently felled timber. Melin was given credit for this by Voorhis, since before the arrival of the insurance adjustor and his crew, no power tools had been available to the men from the *Gemsbok*.

Mayne took a place at the end of the table. Some of the *Gemsbok's* crew came out of the hut to watch. Most of the Kappan warriors attending the chief took up stations between the table and the ship, in a manner suggesting long habit. Mayne guessed that attempts had been made to reenter the ship.

He put Haruhiku at his right hand to translate should it be necessary. Melin and Voorhis sat at his left, their backs to the hut. To the other side of the table, Eemakh brought two Kappans who were explained to Mayne as being the tribal high priest, Igrillik, and Kaynox, who represented a sort of district overlord.

"I meant to land up by *their* city," Voorhis put in, "but we hit some bad winds up in the stratosphere. We got knocked around a bit in the storm, and set down where we could."

"Well, tell me about the details,"

said Mayne. "I want to get this straight from the start, if I can. By the way, Lieutenant Haruhiku, explain to the chief that a special envoy is on the way, that we want his friendship, and that he will be dealt with fairly."

He waited out the exchange of choppy speech between the pilot and Eemakh.

"He says he is sure he will be fairly dealt with," reported Haruhiku.

"I wonder what he meant by that," murmured Mayne. "If we make a deal here, and thereby with his overlord, will that cover enough territory to be official?"

"As much as you can get together anywhere on this world, sir."

Mayne nodded, then turned to Captain Voorhis.

"Now about this so-called crash?" he prompted.

"Well, there was this storm, like I said. Trouble was we didn't expect to hit it and . . . well . . . somebody took it in his head to blow some of the fuel tanks for a crash landing. That's why I'm not claimin' anythin' on the fuel," he finished, turning to Melin.

"We are perfectly willing to pay on that item," replied the insurance man.

"Anyhow," continued Voorhis, "I set down here where we saw the open spot, an' then of course we were stuck with nothin' to lift off with. It looked all right. We'd unload our goods, an' if the local crowd couldn't use them all, why they'd pass the rest on at a profit to themselves. So we come out to palaver, an' then they won't let us go back in the ship. We were just lucky my com man had sent out a landing report when it looked like we piled up, or the Space Force patrol never woulda heard of us."

"Was there any trouble?" asked Mayne. "Any unnecessary hostility?"

Voorhis considered, rubbing the back of his head thoughtfully.

"Well . . . I suppose, lookin' at it their way, they coulda been a lot rougher. A couple of punches got thrown, an' one of my boys got a spear busted over his head, but mostly they acted . . . well . . . maybe more like cops than cannibals."

"Just enforcing the native laws, eh?"

Voorhis did not swallow that quite so graciously. He did not know or care what the local laws might be, but he thought it suspicious in the extreme that he should have plopped down exactly upon the spot chosen by the natives for a temple.

"So do they have to use my ship to hang it on?" he finished plaintively.

"The company is in agreement with you there, captain," Melin put in. "You see, Judge, our point is that nothing is really lost or seriously damaged, neither ship nor cargo. They are merely being withheld from their rightful owner, and we believe that puts the responsibility for recovery upon the Terran government. Captain Voorhis has our entire sympathy—"

"Yeah!" said Voorhis. "An' if I get my head sliced off tryin' to get at

that undamaged cargo, you'll come to my funeral! I say it's a loss!"

"Now, gentlemen!" interrupted Mayne. "Let me get on with this. Both of you, I'm sure, realize that I'm not a lawyer in spite of being a special judge. If the colonies way out here had enough lawyers to spare, I certainly wouldn't be sticking my head into this. Nevertheless, any decision I make here will be regarded as legally binding by the government of Rigel IX, so let us remain level-headed."

"Very well, Judge," said Melin. "Here are the figures on—"

"Please round them off," said Mayne. "If I have to listen to a long list in centicredits, I'll probably go off to see what kind of beer they brew here."

"You wouldn't like it," muttered Voorhis, staring sourly at the village.

"No doubt," grinned Mayne.

Melin swallowed and returned to an inner pocket a sheaf of papers he had withdrawn.

"Speaking very loosely," he went on, as if hating to do anything loosely, "the coverage was about as follows: for the *Gemsbok* herself, two million; but that was really a nominal figure accorded as a sort of courtesy. Otherwise, at her true worth, the authorities would hardly have permitted Captain Voorhis to take her into space—"

"Get on with it," urged Mayne, to forestall any wrangle.

"Er . . . yes. Then on the cargo, the purchase cost of two hundred thousand credits."

Voorhis visibly flinched and began to acquire a ruddy hue.

"And, finally, on the fuel load, the cost price of three hundred thousand. Of course, Judge, there are detailed clauses as to normal use of fuel. He was actually insured against defects, premature explosions, accidental loss, et cetera."

Mayne did some addition in his head.

"So your company," he said aloud, "is prepared to pay two and a half million for the loss sustained by Captain Voorhis. What seems to be wrong with that?"

Both men began to talk but Melin, struggling less with temper, got the lead.

"Actually," he said, "we feel liable for only three hundred thousand."

Now it will get tough, thought Mayne. He silently awaited elucidation.

The combined stares of all parties, including the enigmatic glance of Eemakh, calmed the spluttering Voorhis. Melin continued.

"In the first place, the true value of the ship, even if we consider her to be incapacitated—which we do not—is only about one hundred and fifty thousand."

"She's worth more than that as scrap!" bellowed Voorhis.

"No, captain, just about that. It is exactly how we valued her. Do you have any idea, Judge, of how old that crock is?"

"Let's not go into that just yet," suggested Mayne.

"As to the fuel," said Melin, "I

am willing, as a gesture of good will, to stick my company's neck out—and mine with it, you may be sure—and honor a full claim."

"Even though he used about half the fuel getting here?" asked Mayne.

"We'll ignore that. We admit that he is out of fuel, and we want to—"

"You want to give me a moon and take a star," said Voorhis.

"Just a minute!" Mayne held up his hand. "That's the ship and the fuel. What about the cargo?"

"Why, as to that, Judge, we do not admit that it is lost. It is right over there, easily accessible. We consider it more the job of the Space Force to restore rightful possession than it is the responsibility of the company to reimburse Captain Voorhis for the inflated value he sets upon it."

"I begin to see," murmured Mayne. "You can't stick each other, so you're out to slip *me* the bill."

That aroused a babble of denials. Mayne eventually made himself heard and demanded to know how the spacer's evaluation differed from Melin's. Voorhis pulled himself together, glowering at the insurance man.

"In the first place," he growled, "I don't want his lousy payment for fuel. I said I'd take the blame for that, an' I will. On the ship . . . well, maybe she ain't worth two million. Maybe she ain't been for a few years now—"

Melin made a show of counting on his fingers.

". . . But they charged me premiums by that figure an' I say they oughta pay by that figure."

"But can you prove she's a total loss, captain?" asked Mayne.

Voorhis grimaced and spat upon the ground.

"Try to get near her, Judge! You'll get proof fast enough!"

"Well . . . about the cargo, then?"

"*That's* where he's gouging me!" exploded Voorhis. "The idea of using the cost as of loading on Rigel IX! Hell, you know the margin of profit there is in trading on these new planets, twenty to one at least. I figured to lift off with four million worth of ores, gems, curios, and whatnot."

"So your point is that the mere transportation of the goods through space to this planet increased their value. What about that, Mr. Melin?"

Melin shifted uncomfortably on his bench. Mayne would have liked to change his own position, but feared splinters.

"There is an element of truth in that," admitted Melin. "Still, it would be rash to expect such a return every time a tramp spaceship lands to swap with some aboriginal easy marks."

"I suppose," said Mayne, "that our orange-eyed friends speak no Terran?"

"I hope not!" exclaimed Voorhis.

"Well, anyway," Melin said after a startled pause, "how can we be expected to pay off on hopes? He wants the paper figure for the ship:

but he refuses the paper figure for the cargo."

Mayne shrugged. He turned to Haruhiku.

"If Captain Voorhis and Mr. Melin don't mind, lieutenant, I'd like to get the chief's view of all this."

"Hah!" grunted Voorhis, clapping both hands to his head.

Melin contented himself with rolling his eyes skyward.

With Haruhiku translating, Mayne began to get acquainted with the Kappans. The visitor from the neighboring city chose mostly to listen attentively, but Igrillik, the priest, occasionally leaned over to whisper sibilantly into Eemakh's recessed ear. Mayne fancied he saw a resemblance between the two, despite Igrillik's professional trappings —a long robe of rough material that had been dyed in stripes and figures of several crude colors, and a tall cap to which were attached a number of pairs of membraneous wings.

The first thing that Mayne learned was that the *Gemsbok* was not a spaceship; it was a symbol, a sign sent to the Kappans by the great god Meeg.

"And why did he send it?" asked Mayne.

He had sent it as a sign that he was impatient with his children. They had vowed him a temple, they had set aside the necessary land, and yet they had not begun the work.

"Is that why they're all over there, slaving away so feverishly?"

It was indeed the reason. After all, Meeg was the god of the inner moon, the one that passed so speedily across the sky. If he could guide the strangers' ship directly to his own plot of ground, he might just as easily have caused it to land in the center of the village. They had seen the flames that attended the landing. Could the honored chief from the stars blame them for heeding the warning?

"I see their point," muttered Mayne resignedly. "Well, maybe we can talk sense about the cargo. Tell them that there is much in the holds that would make their lives richer. Tools, gems, fine cloth—give them the story, lieutenant."

This time, Eemakh conferred with the high priest. It developed that the cargo was a sacred gift to be used or not as the god Meeg might subsequently direct. The chief meant no insult. The Kappans realized that Voorhis and his crew were no demons, but starmen such as had often brought valuable goods to trade. The Kappans had not sought to harm or sacrifice them, had they? This was because they were both welcome as visitors and respected as instruments of Meeg.

Eemakh wished to be fair. The starmen might think they had lost by the divine mission. Very well—they would be granted land, good land with forest for hunting and shoreline for fishing. But go near the temple they should not!

"Could *I* get in to inspect the cargo?" asked Mayne.

Haruhiku took this up with the Kappans, who softened but did not yield.

"The best I can get, Judge," said the pilot, "is that they wish it were possible but only those who serve the purposes of Meeg may enter."

"They *would* look at it that way," sighed Mayne. "Let's leave it at that, until we can think this over some more. It's time for a lunch break anyway.

He and Haruhiku were flown back to the scout ship. Mayne brooded silently most of the way. Voorhis thought he was entitled to about six million credits for ship and cargo; Melin thought half a million for the ship and fuel would be stretching it. Mayne foresaw that he would have to knock heads.

The two of them lunched in the pilot's cabin, with hardly room to drop a spoon. Except for companionship, Mayne would as soon have eaten standing in the galley.

He considered the vast area of the planet's land surface. Would it be wiser for the envoy to land elsewhere? What sort of ties were there between tribes?

"Loose," the pilot told him. "Still, word gets around, with no great mountain or ocean barriers. They've

split into groups, but there is a lot of contact."

"So if the Space Force should seize the *Gemsbok,* they'll all hear about it?"

"Within a few weeks, sir. That kind of news has wings on any world. I think we could take her for you, but we might do some damage. The size of a scout crew doesn't lend itself to hand-to-hand brawls."

"And if you sling a couple of torpedoes at the Kappan village, you'll probably wipe it out," said Mayne thoughtfully. "Give the story a month to spread, and no Terran would be trusted anywhere on the planet. Hm-m-m . . . hardly practical!"

"There would also be a chance of damaging the *Gemsbok.*"

"Actually, Eric, I'd hardly care if you blew her into orbit, with Voorhis and Melin riding the fins! But I'm supposed to spread sweetness and light around here—not scraps and parts of spaceships."

He gnawed moodily upon a knuckle, but saw no way to escape putting up some government money. Soaking the company would just make *them* appeal instead of Voorhis.

"This Meeg," he said to change the subject. "How important is he?"

Haruhiku considered a moment before replying.

"They have a whole mess of gods, like most primitive societies. Meeg is pretty important. I think he has a special significance to this tribe . . . you know, like some ancient Terran cities has a special patron."

"He's the god of that little moon?" Mayne asked.

"Oh, more than that, I think. Really the god of speed, a message bearer for the other divinities. There always seems to be one in every primitive mythology."

"Yes," murmured Mayne. "Let's see . . . one parallel would be the ancient Terran Hermes, wouldn't it?"

"Something like that," agreed Haruhiku. "I'm a little vague on the subject, sir. At least, he isn't one of the bloodthirsty ones."

"That helps," sighed Mayne, "but not enough."

He got a message blank from the pilot. With some labor, he composed a request to Terran headquarters on Rigel IX for authorization to spend two million credits on good-will preparations for the Terran-Kappan treaty conference.

It almost sounds diplomatic, he told himself before having the message sent.

The waiting period that followed was more to be blamed upon headquarters pussyfooting than upon the subspace transmission. When an answer finally came, it required a further exchange of messages.

Mayne's last communique might have been boiled down to, "But I *need* it!"

The last reply granted provisional permission to spend the sum mentioned; but gleaming between the lines like the sweep of a revolving

beacon was a strong intimation that Mayne had better not hope to charge the item to "good will." The budget just was not made that way, the hint concluded.

"It's due to get dark soon, isn't it?" he asked Haruhiku, crumpling the final message into a side pocket. "I don't believe I'll resume the talks till morning. Maybe my head will function again by then."

In the morning, one of the scout's crew again took the pilot and Mayne to the meeting by helicopter. Mayne spent part of the trip mulling over a message Haruhiku had received. The spaceship *Diamond Belt* could be expected to arrive in orbit about the planet later the same day, bearing special envoy J. P. McDonald. The captain, having been informed of Haruhiku's presence, requested landing advice.

"I told him what I know," said the pilot. "We can give him a beam down, of course, unless you think we should send him somewhere else.

"Well . . . let's see how this goes," said Mayne. "They seem to be waiting for us down there."

They landed to find Voorhis, Melin, and the native officialdom gathered at the hut facing the new "temple." After exchanging greetings, they sat down at the table as they had the day before.

"All right, gentlemen," said Mayne to the two Terrans. "You win. The government is going to have to put something in the pot. I want to make it as little as possible, so let us have no more nonsense about the true value of ship or cargo as they stand."

They looked startled at his tone. Mayne went on before they could recover.

"The object I have in mind, if it seems at all possible, is to put Captain Voorhis back in business without costing Mr. Melin his job. Now, let's put our heads together on that problem and worry about justifying ourselves later."

The most difficult part was to convince Voorhis to surrender his dream of fantastic profits; but sometime before Mayne got hoarse, the captain was made to see that he could not have his cake and eat it, too.

Melin agreed that he might pay the paper value of the *Gemsbok* if he could pay likewise for the cargo, in which case he would admit a loss. After all, a spaceship anchored by a temple might reasonably be termed unspaceworthy. He would take over the cargo and cut his losses by allowing the government to buy it at two million.

"You wanna come with me next trip?" invited Voorhis when he heard this. "If that's how you cut loose, we'll make a fortune!"

"Well, there it is," said Mayne, straightening up to ease his aching back. He must have been leaning tensely over the table longer than he had thought. "The captain gets two and a half million, Mr. Melin gets off with paying only half a million, and you've stuck me for the rest."

"Congratulations, Judge!" said Melin. "You now own a ship and

cargo which I presume you will present to the Kappans."

"How can he?" demanded Voorhis. "They figure they own it already."

"We'll worry about that later," said Mayne.

"*You* will!" Voorhis guffawed. "I hope you get *some* credit out of it."

Haruhiku interrupted to inform Mayne that the Kappans, who had been interested if bewildered listeners, had invited the Terrans to a small feast.

"I translated enough to let them understand there would be no attempt to disturb their temple building," he explained. "They now feel they owe us hospitality."

"Good, that's something," said Mayne.

"I'll tell you what else will be something," grunted Voorhis. "The food!"

The assemblage repaired to the Kappan village. The Terrans—though it took some doing—survived the feast.

Mayne thought it best not to inquire into the nature of the dishes served. Eemakh was evidently determined to display his village's finest hospitality, so the Terrans even tried the Kappan beer. Mayne absorbed enough to get used to it.

Or did it absorb me? he wondered. *Igrillik's beginning to look almost human!*

Eventually, carts were brought, and they rode bumpily out to admire progress made on the temple. A fresh breeze helped Mayne to remember that it was now late afternoon and he had yet to settle one matter with Eemakh.

When they arrived at the site, crewmen from the *Gemsbok* saw fit to take Voorhis in charge and carry him into their hut. Mayne sank down at the table outside, watching Melin grope to a place beside him. He noticed that Haruhiku's helicopter pilot handed him a message as soon as the lieutenant alighted.

"That will be from the *Diamond Belt,*" Mayne guessed.

He eyed Melin with some amusement. The insurance man stared very quietly at the board beneath his elbows. His complexion held a tint of green. Even Eemakh, plodding ponderously up, lowered himself to a bench with a sigh. The high priest seemed less affected by the celebration, and Mayne was proud when Haruhiku walked over with his normal bland alertness.

"They're getting near?" he asked.

"Doing braking circles," reported the pilot. "I sent an order for the scout to give them a beam. There may still be time to send them somewhere else—"

"One more try here first," Mayne decided. "Tell Eamakh we want to straighten out some confusion about Meeg and the cargo."

Haruhiku permitted himself a small shrug and translated. Eemakh aroused himself to a show of interest, while Igrillik turned a suspicious orange stare upon Mayne. The latter strove to frame in his mind an argu-

ment that would strike them as logical.

"Tell him," he instructed, "that we believe this Meeg was known on Terra, but by another name. Then describe the mythical Hermes and see what he says."

Haruhiku began a conversation that lasted several minutes. Igrillik, as an authority, obviously felt moved to deliver a lengthy opinion. At last, the pilot turned to Mayne.

"They say we are to be congratulated," he reported.

"Is that all?"

"Well, they do seem a bit more friendly. I was going to try drawing a picture of that famous statue, with the winged heels and hat, but it would never match their own conception. Igrillik asks if you claim belief in Meeg."

"Avoid that," said Mayne. "Now—do they know about ship communications?"

"They are aware that it is done," said Haruhiku. "After all, they just saw me send a message to the scout over the helicopter screen."

"Good! Point out to them that the *Gemsbok* also has such equipment."

Haruhiku engaged in another long talk. The Kappans began to show signs of uneasiness at the end. They remained silent.

"And that therefore," added Mayne, "the Terran who served this machine should rank in their eyes as a servant of Meeg just as much as Igrillik. The cargo in the ship was no more his than a message belongs to the messenger bearing it."

The pilot put this into Kappan, with gestures.

"And furthermore," said Mayne, before it could be suggested that the owner might be Meeg, "what I have arranged here with Melin and Voorhis is that the cargo now belongs to all of the Terran people."

Eamakh began to scowl, an impressive contortion on a broad, olive Kappan visage. Mayne hurried on.

"This being the case, the Kappans *have absolutely no right* to deny us the privilege of contributing all these goods to the glory of their temple!"

"Oh, boy!" grunted Haruhiku. He rattled off the translation.

Mayne watched it hit home. Igrillik leaned over to peer at him unbelievingly. Eamakh seemed to have difficulty in focusing his glowing eyes on the Terran.

There were, of course, requests for clarification. Mayne left the repetitions to the pilot.

In the end, Eemakh arose and embraced him, a startling action that left Mayne feeling introspectively of his ribs. Igrillik called out something to the bodyguard attending the chief, causing Mayne to repress a shudder at the flashing display of big Kappan teeth. He assumed that a smile was a humanoid constant.

Haruhiku's pilot approached with a new message.

"Now they have to land near here, in half an hour or less," said the spacer.

"There's just one more thing," Mayne told him. "Voorhis is satisfied, Melin—look, he's gone to sleep

on the table!—is relieved, the Kappans are friendly, and J. P. McDonald will be happy when he lands. Now I have to get myself off the hook for two million!"

He turned to the *Gemsbok* crewmen loitering before the hut.

"Who was the communications man?" he demanded.

A lean, freckled youth with a big nose admitted to the distinction. Mayne draped an arm about his shoulders and told him he was back in business.

"Say to them," he instructed Haruhiku, "that if they are to learn how to use the equipment Meeg has provided for their temple, they must not delay one minute in taking our friend here into the ship . . . uh . . . make that 'temple.' He will show them how a spaceship is called down from the skies."

Haruhiku gave him a straight-faced glance that was a masked guffaw. He translated, and orders began to be shouted back and forth among the Kappans, all the way to the topmost level of the construction. The lieutenant called his pilot.

"I'll have him flash the scout an order to monitor the *Gemsbok* and transfer landing control as soon as they hear her on the air," he explained.

Mayne nodded. He clutched the arm of the *Gemsbok* operator, who was being urged away by Igrillik and a group of warrior escorts.

"Just one thing, son," he shouted over the babble. "Forget about the ship's call sign. You go on the air calling yourself Kappa Orionis Central Control."

"Kappa Orionis Central . . .?" repeated the youth distrustfully.

"You've got it," said Mayne, and shoved him on his way. He turned to Haruhiku. "The last thing to do is to send the helicopter for some paint. I don't care if it *isn't* dry when the *Diamond Belt* touches down—I want a sign over the door of this hut!"

"A sign?"

"Make it read 'Spaceport Number 1.' Two million is cheap enough for buying a spaceport already in operation. There won't be any trouble, since the Kappans promised the land."

Everyone seemed to be running somewhere. Mayne wiped his face with a handkerchief and sat down beside Melin, who looked comfortable enough with his head on the table.

From inside the hut, Mayne could hear snores that must have Voorhis as a source; the rest of the *Gemsbok* crewmen had followed the crowd to the control tower that was also a temple. After a while, Haruhiku returned and sat down across from Melin.

"Magnificent, Judge!" he said. "We might even get away with it."

"Of course we will," said Mayne, gazing at Melin and listening to Voorhis. "After all, Hermes was the god of thieves, too!"

THE END

THE HIGH CRUSADE

By POUL ANDERSON

SYNOPSIS

The spaceship captain opened the translated chronicle and began to read. It might explain what he had found on this planet . . .

I, Brother Parvus, a friar of the abbey at Ansby in Lincolnshire, do here record that in the year 1345 our baron, Sir Roger de Tourneville, was gathering at his castle an army of free companions to go join King Edward in the French war. Besides himself, the band included two knighted men, old Sir Brian Fitz-William and dashing young Sir Owain Montbelle. Half Welsh, but educated in courtly circles, the latter was a guest pleasing to Sir Roger's wife Catherine, who in this remote and backward fief missed the graces of her own high-born Winchester

Illustrated by
Van Dongen

Conclusion. The immense difference between knowledge and wisdom is one that the highly educated prefer to overlook. The simple barbarian, certainly, cannot compete with the highly sophisticated. Obviously not . . . it says here!

family. Even her small children, Robert and Matilda, were scant consolation for her husband's well-meaning but rough manners and frequent warlike absences.

Our town was a broil of men-at-arms, archers, and cavalrymen when the Wersgor ship landed. A monstrous cylinder, it descended from the sky. As the people crowded around, a squat creature of blue skin and bestial face emerged from a portal and shot down a man with a fire-bolt. Despite their horror, Sir Roger and his English soldiers did not flee as expected, but stormed up the gangway into the vessel, where they attacked so wildly that only one alien survived. I was put in charge of interrogating this prisoner.

He was quick to learn some Latin from me, and to say he was not a demon—a claim somewhat reinforced by the fact that he did not go up in smoke when I led him through the Pater Noster—but a member of a nonhuman mortal race, the Wersgorix. His own name was Branithar. Having explained his unique astrological concept of suns and worlds scattered through space, he boasted that his people had been expanding through the universe for the past three hundred years. Where they found a planet similar to their own, they exterminated or enslaved any

primitive natives there might be—like ourselves—and colonized the place with a few million only; for each wealthy Wersgor desired enormous and luxurious estates. Branithar's ship had been a scout searching almost at random for new territory. Its crew had meant to terrorize our neighborhood, load specimens of our soil and life aboard, and return home to report what they had found.

Sir Roger felt as skeptical of this wild tale as I. However, since other blue bandits might arrive from Huy Braseal or wherever they actually lived, he felt we needed knowledge of the captured ship and guns, and had been studying these. Branithar was forced to operate the vessel for us. It was so big that it could hold all the soldiers and the civil population of Ansby, with supplies and livestock. Sir Roger decided to utilize this capability. With such a comfortably housed, well supported force, in such an irresistible flying craft, he could end the French war, liberate the Holy Land, and be back with plunder and glory for even the lowliest serf—before hay harvest. Enthusiastically, his folk went aboard. I was one of a few clerics who accompanied them, with rather more forebodings.

Branithar raised ship—then, suddenly activated an automatic steersman and locked its controls. The ship left Earth itself at a speed faster than light. Branithar defied us to do our worst to him. He had set a course for his home base, the planet Tharixan, on the border of the Wersgor realm; nothing could release the homunculus operating our ship until we arrived. He counselled us to surrender at that time, and we must needs kept him unharmed as an interpreter.

Sir Roger put a cheerful face on the matter which reassured most of his people. Lady Catherine and Sir Owain were among the few who saw through this; more and more, they turned to each other's company for comfort. The leaders, and my humble self, used the time of the voyage to familiarize ourselves with the strange implements we found. Though these were built on esoteric principles, the actual use proved simple to anyone wont to wrestling with Earth's hand-operated engines. I also learned somewhat more of the blueskins' tongue, and more astrology. Their domain included about a hundred worlds, scattered across two thousand light years amidst a far larger number of stars useless to this form of life. Theoretically a republic, in fact the nation was a tyranny centered at its capital planet, Wersgorixan. There were three other star-traveling peoples known so far, but their power was insignificant and the Wersgorix forced them to remain weak.

Tharixan proved a typical planet of our foes, thinly settled, with only three fortresses. When the locked controls released themselves, Sir Roger flew to the nearest castle, hight Ganturath. Its suspicious commander sent fliers up to board us while his great fire-bombards aimed at us from the ground; for this ship was

not big enough to carry the generators of those force fields which protected Ganturath from our flame weapons. Sir Roger shot down the fliers, and evaded the anti-spacecraft defenses by landing our vessel directly on the main keep, thus thoroughly wrecking both. His men rushed out and fell on the garrison. Since the Wersgorix had had no serious rivals for centuries—their conquests being mere slaughter of helpless savages—they had neglected the arts and equipment of hand-to-hand combat. We English soon overran them. Force screens did not stop material objects, so Sir Roger led a cavalry charge against the outlying emplacement and captured it intact, while the longbowmen of Red John Hameward brought down those small unarmored aircraft which swooped low to shoot at us. 'Twas a glorious victory.

Reluctantly, however, the baron yielded to the insistence of his captains that it was best we escape in the lesser spaceships we had seized before overwhelming force arrived from the other castles. But then we learned in horror that the navigational notes of the scouting expedition had been destroyed by a stray fire beam during the battle. Though Earth was not many days' straight-line travel away, the sheer number of unmapped stars, through which the scout had zigzagged almost at random, and the blurring effect of cosmic clouds, made it impossible to find our way home without close directions. Branithar, an engine-room officer, had not paid heed to the course and could give us no hint. Thus Sir Roger had no choice but to rally us for further trials. The prospect was not uncheering to him and he heartened most others with his promise of gold, glory, and ultimate triumphant return. But Lady Catherine turned on him for his rashness which had brought us to this pass.

Before the long night of Tharixan had worn away, an aerial armada reached us, summoned by fugitives from Ganturath who had gotten to a far-speaker on some estate. Because of the many prisoners we held, as well as uncertainty about us, the Wersgorix did not attack at once. Their leader, agreed to parley. My lord used the time thus gained to interrogate captives, prepare defenses, and let his men practice with the alien machines. Under threat of torture, Branithar proved a sullen but valuable help in all this. He was also learning a little English.

Meanwhile, with myself for interpreter, Sir Roger more than half convinced Huruga, their leader, we were a punitive expedition sent by an older and stronger civilization. But the truce could not be expected to last long—especially since it had not been guaranteed by oaths on either side—and we needed more weapons ere the inevitable storm broke. Sir Roger smuggled a party of men under Sir Owain and Red John into the forest, with a small flying boat, some explosive shells, and a trebuchet to cast them. They were

to flit to the next fortress, Stularax, burst in and plunder its arsenal.

As the discussion with Huruga proceeded next day, word came that Stularax had vanished in a puff of fire. Evidently the Wersgorix had not exaggerated the power of their gunpowder as much as we had thought. What now had become of our raiders, and the arms they were to seize, caught in such a blast? Huruga refused to swallow Sir Roger's claim that Saracens must be responsible. For the sake of the prisoners we held, he let us return to our camp, captured Ganturath. For the same reason, as well as because he needed his flying craft to hunt down this new menace, Huruga said he would attack us on the ground only, and use no explosives. Even so, his power was immensely greater than ours. "Yet Englishmen have ever fought best with their backs to the wall," said Sir Roger.

When the Wersgorix attacked, their heavy, armored war-wagons fell into our camouflaged pits. The lighter open cars were stopped by abatis, caltrop, bolt and arrow fire, and finally driven into retreat when our horsemen charged. The blueface infantry advanced doggedly, firing pellet weapons, taking fearful losses from our archers but winning at last to our breastworks. Here our men proved their superiors in close-order combat, and they were forced back. However, they had marked a safe path for the invincible heavy wagons. These advanced—but before they reached us, a shellburst out in the forest warned Huruga that such artillery could wipe him out if he overran us. He withdrew his forces and searched frantically for the hidden bombard. He failed to find it, since it was our trebuchet, whose wooden frame did not respond to the Wersgor metal-sniffers. Sir Owain's raiders had lobbed a shell or two at Stularax, been astonished when it disappeared, and hastened back to threaten Huruga with these potent forces. Having learned the truth, Sir Roger pulled all his folk into Ganturath's bombproof shelters; Red John's fire made havoc of the Wersgor positions, and Huruga retreated to the main castle on this planet, Darova.

We could obviously not stay here, for long-range bombardment could destroy us, too. Furthermore, within a few weeks at most we could expect enormous reinforcements to come from Wersgorixan, whither Huruga must have sent spaceships asking help. Sir Roger determined to seize Darova, which was built as an ultimate strong point, self-contained and unshatterable. We flitted thither in vessels and told Huruga on the farspeaker that he was under siege. He was quite content to wait, impregnable underground, until the armada came. But first Sir Roger harried the countryside—for which Huruga was responsible—and then sent thousands of captured Wersgorix on foot toward the castle. This was far more than Huruga could feed, since siegecraft was another lost art in this world of swift and devastating weap-

ons. He surrendered, and we English were the conquerors of a planet.

But we could never hold it against the power surely to be marshaled against us: not without help. Sir Roger left Darova manned by women, children, and aged, competent enough to handle the great automatic weapons. Lady Catherine was in command; though angry with him, she would not fail us. The main English force embarked on the many spaceships we now possessed, and which some of us had now learned to operate. We set off for the planet called Boda. Its people, the Jairs, were among those who had long traveled among the stars but had been forced by Wersgorixan to stifle their ambitions. Without ever actually lying to these potential allies, Sir Roger gave them the impression that we were stronger and wiser than themselves; he declared a crusade against the cruel heathen Wersgorix, and called upon the Jairs to join it.

PART 3

XVI.

HE Jairs, like the other free nations, were no simpletons. They invited us to land and be guests on their planet. Strange was that stay, as if we spent it in timeless Elf Hill. I remember slim towers, bridges looped airily between, cities where buildings mingled with park to make one gigantic pleasance, boats on bright lakes, scholars in robe and veil who would discourse with me of English learning, enormous alchemical laboratories, music that still haunts my dreams. But this is no geographical book. And even the soberest account of ancient nonhuman civilizations would sound wilder to a common English ear than the fantasies of that notorious Venetian, Marco Polo.

While Jair war-leaders, wise men, and politicians sought to probe us for information, however courteously, an expedition hastened to Tharixan to see for itself what had happened. Lady Catherine received them with much pomp, and allowed them to interview any Wersgorix they chose. She hid away only Branithar, who would have given them too much truth. The rest, even Huruga, had nothing but a confused impression of irresistible onslaught.

Being unfamiliar with the variations in human appearance, they did not realize that the Darova garrison was composed of our weakest. But they counted it, and could hardly believe that so small a force as ours had accomplished all this. Surely we must have unknown powers in reserve! When they saw our neatherds, riders on horseback, women cooking over wood fires, they swallowed easily enough an explanation that we English preferred as much open-air simplicity of life as possible; it was an ideal of their own.

Fortunate we were that the language barrier limited them to what they could observe of us with their eyes. Those lads learning Wersgor

had, as yet, mastered too few words for intelligible conversation. Many a commoner—or even warrior, it may be—would have blurted his own terror and ignorance, begged them to take him home again, had he been able. As it was, all detailed speech with the English must be filtered through myself. And I relayed Sir Roger's cheerful arrogance as best my failing language could.

He did not hide from them that an avenging Wersgor fleet would soon fall on Darova. Rather, he boasted of it. His trap was set, he claimed. If Boda and the other starfaring planets would not help him spring it, he must call England for reinforcements.

The idea of an armada from a totally unknown realm, entering their region of space, disquieted the Jair leaders. I make no doubt that some of them took us for mere adventurers, outlaws perhaps, who could actually count on no help from our birthplace. But then others must have argued:

"Dare we stand by and take no hand in what is to happen? Even if they are pirates, these newcomers have conquered a planet, and show no fear of the whole Wersgor Empire. In every case, we must arm ourselves against the possibility that England is—despite their denials—as aggressive as the blueface nation. So would it not be best to strengthen ourselves by helping this Roger, occupying many planets and taking much booty? The only alternative seems to be to make alliance with Wersgor against him, and that is unthinkable!"

Furthermore, the imagination of the Jair people was captured. They saw Sir Roger and his brilliant companions gallop down their sedate avenues. They heard of the defeat he had inflicted on their old enemies. Their folklore, which had long based itself on the fact that they knew only the smallest portion of the universe, predisposed them to believe that older and stronger races existed beyond their maps. Thus, when they heard that he urged war, they took fire and clamored for it. Boda was a true republic, not a sham one such as the Wersgor had. This popular voice rang loud in the parliament.

The Wersgor ambassador protested. He threatened destruction. But he was far from home, the dispatches he sent would take time to arrive, and meanwhile crowds stoned his residence.

Sir Roger himself conferred with two other emissaries. These were the representatives of the other starfaring nations, Ashenkoghli and Pr?*tans. The odd letters in the latter name are my own, standing respectively for a whistle and a grunt. I will let one such conversation stand for the many that took place.

As usual, it was in the Wersgor language. I had more trouble interpreting than I was wont, since the Pr?*tan was in a box which maintained the heat and poisonous air he needed, and talked through a loudspeaker with an accent worse than

my own. I never even tried to know his personal name or rank, for these involved concepts more subtle to the human mind than the books of Maimonides. I thought of him as Tertiary Eggmaster of the Northwest Hive, and privately I named him Ethelbert.

We visitors were seated in a cool blue room, far above the city. While Ethelbert's tentacled shape, dimly seen through glass, labored with formal courtesies, Sir Roger glanced out at the view. "Open windows, broad as a sally port," he muttered. "What an opportunity! How I'd love to attack this place!"

When our talk was begun, Ethelbert said: "I cannot commit the Hives to any policy. I can only send a recommendation. However, since our people have minds less individualistic than average, I may add that my recommendation will carry great weight. At the same time, I am correspondingly hard to convince."

We had already been given to understand this. As for the Ashenkoghli they were divided into clans; their ambassador here was chief of one and could raise its fleet on his own authority. This so simplified our negotiations that we saw God's Purpose revealed. I daresay the confidence we gained thereby was itself a powerful asset to us.

"Surely you, good sir, are aware of the arguments we've given the Jairs," Sir Roger said. "They're no less applicable to Pur . . . Pur . . . whatever your by-our-lady planet is called."

I felt an exasperation, that he should throw on me the whole burden of pronunciation and polite rephrasing, and set myself a rosary in penance. Wersgor was so barbarous that I could still not think properly in it. Accordingly, when interpreting Sir Roger's French, I first put the gist into my own boyhood English, then into stately Latin periods, on which firm foundation I could erect a Wersgor structure that Ethelbert mentally translated into Pr?*tan. Marvelous are the works of God.

"The Hives have suffered," admitted the ambassador. "The Wersgorix limit our space fleet and extraplanetary possessions; they exact a heavy tribute of rare metals. However, our home world is useless to them, so we have no fear of ultimate conquest like Boda and Ashenk. Why should we provoke their wrath?"

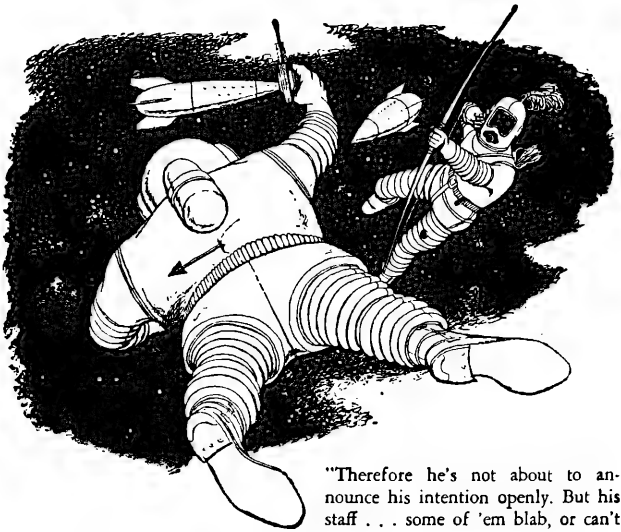
"I suppose these creatures have no idea of honor," the baron grumbled to me, "so tell him he'll be free of those restrictions and tribute, once Wersgorixan is overthrown."

"Obviously," was the cold reply. "Yet the gain is too small, in comparison with the risk that our planet and its colonies may be bombarded."

"That risk will be much lessened, if all Wersgorixan's foes act together. The enemy'll be kept too busy to take offensive action."

"But no such alliance exists."

"I've reason to believe the Ashenkogh lord here on Boda plans to join us. Then many other clans of theirs are sure to do likewise, if only to keep him from gaining too much power."



"Sire," I protested in English, "you know that he of Ashenk is less than ready to stake his fleet on this gamble."

"Tell the monster here what I said, anyhow."

"My lord, it isn't true!"

"Ah, but we'll make it come true; so 'tis no lie after all."

I choked on the casuistry, but rendered it as required of me. Ethelbert shot back: "What makes you think so? He of Ashenk is known to be a cautious one."

"Certes." It was a shame that the blandness of Sir Roger's tone was wasted on those nonhuman ears. "Therefore he's not about to announce his intention openly. But his staff . . . some of 'em blab, or can't resist dropping a hint—"

"This must be investigated!" said Ethelbert. I could all but read his thoughts. He would set his own spies, hireling Jairs, to work.

We hied ourselves elsewhere and resumed some talks Sir Roger had been having with a young Ashenkogh. This fiery centaur was himself eager for a war in which he might win fame and wealth. He explained the details of organization, record-keeping, communication, which Sir Roger needed to know. Then the baron instructed him: what documents to forge and leave for Ethelbert's agents to find, what words to

let fall in drunkenness, what clumsy attempts to make at bribing Jair officials . . . Erelong everyone but the Ashenkoghli ambassador himself knew that he was planning to join us.

So Ethelbert sent a recommendation of war to Pr?*t. It went secretly, of course, but Sir Roger bribed the Jair inspector who passed diplomatic messages out in special boxes to the mailships. The inspector was promised an entire archipelago on Tharixan. That was a shrewd investment of my lord's, for it won him the right to show the Ashenkoghli chief that dispatch ere it continued on its way. Since Ethelbert had so much confidence in our cause, the chief sent for his own fleet and wrote letters inviting the lords of allied clans to do likewise.

By now, the military intelligence of Boda knew what was going on. They could certainly not allow Pr?*t and Ashenk to reap so rich a harvest while their planet remained insignificant. Accordingly, they recommended that the Jairs also join the alliance. Thus urged, the parliament declared war on Wersgorixan.

Sir Roger grinned all over his face. "'Twas easy to do," he said when his captains praised him. "I needed but to inquire the way in which things are done hereabouts, which was never secret. Then the star-folk tumbled into snares which would not have fooled a half-witted prince of Germans."

"But how could that be, sire?" asked Sir Owain. "They're older and stronger and wiser than we."

"The first two, granted," nodded the baron. His humor was so good that he addressed even this knight with frank fellowship. "But the third, no. Where it comes to intrigue, I'm no master of it myself, no Italian. But the star-folk are like children.

"And why? Well, on Earth there've been many nations and lords for many centuries, all at odds with each other, under a feudal system nigh too complicated to remember. Why've we fought so many wars in France? Because the Duke of Anjou was on the one hand the sovereign king of England and on the other hand a Frenchman! Think you what that led to; and yet 'tis really a minor example. On our Earth, we've perforce learned all the knavery there is to know.

"But up here, for centuries, the Wersgorix have been the only real power. They conquered by only one method, crude obliteration of races which had not weapons to fight back. By sheer force—the accident that they had the largest domain—they imposed their will on the three other nations which possessed such military arts. These, being impotent, never even tried to plot against Wersgorixan. None of this has called for more statecraft or generalship than a snowball fight. It took no skill for me to play on simplicity, greed, dawning fear and mutual rivalry."

"You are too modest, sire," Sir Owain smiled.

"Argh!" The baron's pleasure van-

ished. "Satan take such matters. The only important thing now is: here we sit, stewing, until the fleet is raised. And meanwhile the enemy is on his way!"

Indeed that was a nightmare time. We could not leave Boda, to join our women and children in the fortress. For the alliance was still unstable. A hundred times Sir Roger must patch it up, often using means that cost him dearly in the next life. The rest of us spent our time studying history, languages, geography—or should I say astrology?—and the witchlike mechanic arts. This latter must be done on pretext of comparing local engines with those of our home, to the detriment of the former. Luckily, though not unnaturally—Sir Roger had extracted the information from officers and documents, ere we left Tharixan—certain of the arms we captured there were secret. Thus we could demonstrate an especially effective handgun or explosive ball, and claim it was English, taking care that none of our allies got too close a look at it.

The night the Jair liaison ship returned from Tharixan, with word that the enemy armada had arrived, Sir Roger went alone into his bedchamber. I do not know what happened, but next morning his sword needed sharpening and all the furniture lay in splinters.

God granted, though, that we had not much longer to wait. The Bodavant fleet was already gathered in orbit. Now several dozen lean battlecraft from Ashenk arrived, and soon thereafter the boxlike vessels of Pr?*t lumbered in from their poisonous home world. We embarked and roared off to war.

Our first glimpse of Darova, after we had fought past outlying Wersgor ships and into Tharixan's atmosphere, made me doubt that ought was left to rescue. For hundreds of miles around, the land lay black, ripped, and desolated. Rock bubbled molten wherever a shell had newly struck. That subtle death which can only be sensed with instruments had lain waste this entire continent, and would linger for years.

But Darova was built to withstand such forces, and Lady Catherine had provisioned it well. I glimpsed a Wersgor flotilla as it screamed low above her force field. Their missiles burst close, causing the near-solid stone of the aboveground structures to flow on the outside—but leaving the interiors unharmed. The seared earth opened; bombards thrust out like viper tongues, spat lightning, and retracted ere fresh explosives could smite. Three Wersgor ships tumbled in ruin. Their wrecks were added to the carnage which was left from an attempt to storm this place on the ground.

Then I saw no more of smoke-veiled Darova. For the Wersgorix were upon us in force and the combat moved up again into space.

Strange was that battle. It was fought at unimaginable distances with fire-beams, cannon shells, unmanned missiles. Ships maneuvered under di-

rection from artificial brains, so fast that only the weight-making fields prevented their crews from being smeared across the bulkheads. Hulls were blown open by near-misses, yet could not sink in airless space: the wounded portions sealed themselves off and the remainder continued to shoot.

Such was the usual way of space war. Sir Roger made an innovation. It had horrified the Jair admirals when he first proposed it, but he had insisted it was a standard English tactic—which it was, in a way. Actually, of course, he did it for fear that his men would otherwise betray their clumsiness with the hell-weapons.

So he disposed them in numerous small, exceedingly fast craft. Our overall plan of battle was made highly unorthodox, for no other reason than to maneuver the enemy into certain positions. When that chance came, Sir Roger's boats flitted into the heart of the Wersgor fleet. He lost some few, but the others continued their outrageous orbit, to the very flagship of the foe. It was a monstrous thing, almost a mile long, even big enough to carry force-field generators. But the English used explosives to punch through its hull. Then in space armor, atop which the knights planted their crests—carrying sword, ax, halberd, and bow, as well as handguns—they boarded.

They were not enough to seize that entire labyrinth of corridors and cabins. Yet they enjoyed themselves, suffered small loss—sailors out here being untrained in hand-to-hand fighting—and threw matters into a confusion which vastly aided our general assault. Eventually the crew abandoned that ship. Sir Roger saw them doing so and withdrew his own troops just before the hull was blown to bits.

Only God and the more warlike saints know if his action proved decisive. The allied fleet was outnumbered and very much outgunned, so every gain we made was valuable out of proportion. On the other hand, our attack had come as a surprise. And we had boxed the foe between ourselves and Darova, whose largest missiles flew into space itself to destroy Wersgor craft. The fortress was no mean foe for even spacecraft.

I cannot describe the vision of St. George, for it was not my privilege to observe this. However, many a sober, trustworthy man-at-arms swore that he saw the holy knight ride down the Milky Way in a foam of stars and impale enemy ships on his lance like so many dragons. Be this as it may, after many hours which I remember but dimly, the Wersgorix gave up. They withdrew in good order, having lost perhaps a fourth of their fleet, and we did not pursue them far.

Instead, we hovered above blackened Darova. Sir Roger and the chiefs of his allies went down in a boat. In the central underground hall, the English garrison, grimy and exhausted from days of battle, gave a feeble cheer. Lady Catherine took time to bathe and garb herself in her

best, for honor's sake. She swept out like a queen to greet the captains.

But when she saw her husband, standing in dented space armor against the chilly glow-light, her stride faltered. "My lord—"

He took off his glazed helmet. The air tubes got somewhat in the way of his knightly gesture, as he tucked it under an arm and went to one knee before her. "No," he cried aloud. "Say not that. Let me rather say, 'My lady and love.' "

She advanced like a sleepwalker. "Is the victory yours?"

"No. Yours."

"And now—"

He rose, grimacing as the necessities clamped back down on him. "Conferences," he said. "Repair of battle damage. Making of new ships, raising of more armies. Intrigues among allies, heads to knock together, laggards to hearten. And fighting to do, always fighting. Until, God willing, the bluefaces are whipped back to their home planet and submit—" He stopped. Her face had lost its quick lovely color. "But for tonight, my lady," he said, unskillfully, though he must have rehearsed it many times, "I think we've earned the right to be alone, that I may praise you."

She drew a shaken breath. "Did Sir Owain Montbelle live?" she asked. When he did not say no, she crossed herself, and a tiny smile flickered on her lips.

Then she bade the alien captains welcome, and held out her hand for them to kiss.

XVII.

I come now to a grievous part of this history, and the most difficult to write. Nor was I present, save at the very end.

This was because Sir Roger hurled himself into his crusade as if he fled from something—which in a way was true—and I was dragged with him like a leaf whirled along in a gale. I was his interpreter, but at every moment when we had naught else to do I became his teacher and would instruct him in Wersgor until my poor weak flesh could endure no more. My last glimpse, ere I toppled into sleep, would be of candlelight guttering on my lord's haggard face. Then he would often as not summon a doctor of the Jair language, who would teach him until dawn. At this rate, it was not many weeks before he could curse hideously in both tongues.

Meanwhile, he drove his allies nigh as hard as he did himself. The Wersgorix must be given no chance to recover. Planet after planet must be attacked, reduced, and garrisoned, so that the foe always fought off balance, on the defensive. In this task, we had much help from enslaved native populations. As a rule, these need only be given arms and leadership. Then they attacked their masters in such hordes, with such ferocity, that the latter fled to us for protection. Jairs, Ashenkoghli, and Pr?*tans were horrified. They had no experience in such matters: whereas Sir Roger had encountered the Jacquerie

in France. In their bewilderment, his fellow chieftains came more and more to accept his unquestioned leadership.

The ins and outs of what happened are too complex, too various from world to world, for this paltry record. But in essence, on each inhabited planet, the Wersgorix had destroyed whatever original civilization existed. Now the Wersgor system in turn was toppled. Into this vacuum—unreligion, anarchy, banditry, famine, the ever-present menace of a blueface return, the necessity of training the natives themselves to eke out our thin garrisons—Sir Roger stepped. He had a solution to these problems, one hammered out in Europe during those not dissimilar centuries after Rome fell: the feudal system.

But just when he was thus laying the cornerstone of victory, it crumbled for him. God rest his soul! No more gallant knight ever lived. Even now, a lifetime later, tears dim my old eyes, and I were fain to hurry over this part of the chronicle. Since I witnessed so little, it would be excusable for me to do so.

However, those who betrayed their lord did not rush into it. They stumbled. Had Sir Roger not been blind to all warning signs, it would never have happened. Therefore I shall not set it down in cold words, but fall back on the earlier—and, I think, truer—practice of inventing whole scenes, that folk now dust may live again and be known, not as abstract villainies, but as fallible souls: on whom perhaps God, at the very last, had mercy.

We begin on Tharixan. The fleet had just departed, to seize the first Wersgor colony of its long campaign. A Jair garrison occupied Darova. But those English women, children, and grandsires who had so valiantly held fast, were given what reward lay in Sir Roger's power. He moved them to that island where our kine were pastured. There they could dwell in woods and fields, erecting houses, herding, hunting, sowing and reaping, almost as if it were home. Lady Catherine was set to rule over them. She kept Branithar, of the Wersgor captives, as much to prevent his revealing too much to the Jairs as to continue giving instruction in his language. She also had a small fast spaceship for emergency use. Visits from the Jairs across the sea were discouraged, lest they observe too closely.

It was a peaceful time, save in my lady's heart.

For her the great grief began the day after Sir Roger embarked. She walked across a flowery meadow, hearing wind sough in the trees. A pair of her maids followed behind. Through the woods came voices, the ring of an ax, the bark of a dog, but to her they seemed of dreamlike remoteness. The scents here were strange, but yet pleasing.

Suddenly she halted. For a moment she could only stare. Then one hand stole to the crucifix on her breast. "Mary, have pity." Her maids,

well-trained, slipped back out of earshot.

Sir Owain Montbelle hobbled from the glade. He was in his gayest garb, nothing but a sword to remind her of war. The crutch on which he leaned hardly interfered with his gracefulness as he swept off his plumed bonnet in a bow.

"Ah," he cried, "this instant the place has become Arcady, and old Hob the swineherd whom I just met is heathen Apollo, harping a hymn to the great witch Venus."

"What's this?" Catherine's eyes were blue dismay. "Has the fleet returned?"

"Nay." Sir Owain shrugged. "Blame my own awkwardness yestre'en. I was frolicking about, playing ball, when I stumbled. My ankle twisted, and remains so weak and tender that I'd be useless in battle. Perforce I deputed my command to young Hugh Thorne and flitted hither in an aircraft. Now I must wait till I am healed, then borrow a ship and a Jair pilot to rejoin my comrades."

Catherine tried desperately to speak sober words. "In . . . in his language lessons . . . Branithar has mentioned that the star folk have s-s-strange chirurgic arts." She flushed like fire. "Their lenses can look . . . even inside a living body . . . and they inject simples which heal the worst wound in days."

"I thought of that," said Sir Owain. "For of course I would not be a laggard in war. But then I remembered my lord's strict orders, that our entire hope depends for the nonce on convincing these demon races we are as learned as they."

She clasped the crucifix still tighter.

"So I dared not ask help of their physicians," he continued. "I told them instead that I remain behind to attend certain matters of moment, and carry this crutch as a penance for sin. When nature has healed me, I will depart. Though in truth, 'twill be like tearing out my own heart, to go from you."

"Does Sir Roger know?"

He nodded. They passed hastily to something else. That nod was a black lie. Sir Roger did not know. None of his men dared tell him. I might have ventured it, for he would not strike a man of the cloth, but I was also ignorant. Since the baron avoided Sir Owain's company these days, and had enough else to occupy his mind, he never thought of it. I suppose in his innmost soul he did not want to think of it.

Whether Sir Owain really hurt his ankle, I dare not say. But it would be a strange coincidence. However, I doubt if he had planned his final treason in detail. Most likely his wish was to continue certain talks with Branithar, the Wersgorix, and see what developed.

He leaned close to Catherine. His laughter rang out. "Until I go," he said, "I feel free to bless the accident."

She looked away, and trembled. "Why?"

"I think you know." He took her hand.

She withdrew it. "I beg you, remember my husband is at war."

"Misdoubt me not!" he exclaimed. "I would sooner lie dead than be dishonored in your eyes."

"I could never . . . misdoubt . . . so courteous a knight."

"Is that all I am? Courteous only? Amusing? A jester for your weary moments? Well-a-day, better Catherine's fool than Venus' lover. So let me then entertain you."

And he lifted his clear voice in a roundel to her praise.

"No—" She moved from him, like

a doe edging clear of the hunter. "I am . . . I gave pledges—"

"In the courts of Love," he said, "there is only one pledge, Love itself." The sunlight burnished his hair.

"I have two children to think of," she begged.

He grew somber. "Indeed, my lady. I've often dandled Robert and little Matilda on my knee. I hope I may do it again, while God allows."

She faced him afresh, almost crouching. "What do you mean?"

"Oh— Nay." He looked into the murmurous woods, whose leaves were of no shape or color ever seen on Earth. "I would not voice disloyalty."

"But the children!" This time it was she who seized his hand. "Owain, if you know aught, speak!"

He kept his face turned from her. He had a fine profile. "I am not privy to any secrets, Catherine," he said. "Belike you can judge the question better than I. For you know the baron best."

"Does anyone know him?" she asked in bitterness.

He said, very low, "It seems me that his dreams grow with each new turn of fate. At first he was content to fly to France and join the King. Then he would liberate the Holy Land. Brought here by evil fortune, he responded nobly: none can deny that. But having gained a respite, has he sought Terra again? No, he took this whole world. Now he is off to conquer suns. Where will it end?"

"Where—" She could not continue. Nor could she pull her gaze from Sir Owain.

The knight said, "God puts bounds to all things. Unlimited ambition is the egg of Satan, from which only woe can hatch. Does it not seem to you, my lady, when you lie sleepless at night, that we will overreach ourselves and be ruined?"

"What can we do?" she cried in her anguish. "We've lost our way to Earth!"

"It might be found again," he said.

"In a hundred years of search?"

He watched her in silence for a while before he answered:

"I would not raise false hopes in so sweet a bosom. But from time to time I've conversed a little with Branithar. Our knowledge of each other's tongues is but scant, and certes he does not trust any human overmuch. Yet . . . a few things he has said . . . make me think that perhaps the road home might be found."

"What?" Both her frantic hands seized him. "How? Where? Owain, are you gone mad?"

"No," he said with studied roughness. "But let us presume this be true, that Branithar can guide us despite all. He'll not do so without a price, I suppose. Do you think Sir Roger would renounce his crusade and go quietly back to England?"

"He . . . why—"

"Has he not said again and yet again: while the Wersgor power remains, England lies in mortal danger? Would not the rediscovery of

Terra only lead him to redouble his efforts? For you must know even better than I, my lady, all the reasons he gives for this enterprise sound rational enough—perhaps they are—but at heart he is embarked on the conquest of the stars because he wants to. Because nowhere else can he strive so mightily, and live so sharply, and dream so boldly . . . and Hell take all sniveling safe procedure!

"Nay, what use is to learn the road back? While Sir Roger has his way, the war will continue, whatever happens, until it ends in our destruction."

She shuddered and crossed herself.

"Since I am here," Sir Owain finished, "I may as well try to learn if the homeward route can indeed be found. Perhaps you can think of some means to use that knowledge, ere it is too late."

He bade her a courtly good day, which she did not hear, and limped on into the forest.

XVIII.

Many long Tharixanian days passed: weeks of Earth time. Having taken the first planet he aimed at, Sir Roger went on to the next. Here, while his allies distracted the enemy gunners, he stormed the main castle afoot, using foliage to conceal his approach. This was the place where Red John Hameward actually did rescue a captive princess. True, she had green hair and feathery antennae, nor was there any possibility of issue between her species and our own. But the humanlikeness, and exceeding gratitude, of the Vashtunari—who had just been in process of being conquered—did much to cheer lonely Englishmen. Whether or not the prohibitions of Leviticus are applicable is still being hotly debated.

The Wersgorix counterattacked from space, basing their fleet in a ring of planetoids. Sir Roger had taken an opportunity while en route to turn off the artificial weight aboard ship and let his men practice movement under such conditions. So now, armored against vacuum, our bowmen made that famous raid called the Battle of the Meteors. Clothyard shafts pierced many a Wersgor spacesuit without fire-flash or magnetic force-pulse to give away a man's position. With their base thus depleted of manpower, the enemy withdrew from the entire system. Admiral Beljad had grabbed off three other suns while they were occupied with this one, so their new retreat was a long one.

And on Tharixan, Sir Owain Montbelle made himself pleasant to Lady Catherine. And he and Branithar felt each other out, cautiously, under pretext of language study. At last they thought they had touched mutual understanding.

It remained to convince the baroness.

I believe both moons had risen. Treetops were hoar with that radiance; double shadows reached across grass where dew glittered; by now, the night sounds had become

familiar and peaceful. Lady Catherine left her pavilion, as often after her children were fallen asleep and she unable to. Wrapt in a hooded mantle, she walked down a lane intended for the street of the new village, past half-finished wattle huts that were blocks of shadow under the moons, and out onto a meadow through which ran a brook. The water flowed and sparkled with light; it chimed on rocks. She drank a warm strange smell of flowers, and remembered English hawthorn when they crowned the May Queen. She remembered standing on the pebble beach at Dover, newly wed, when her husband had embarked on a summer's campaign, and waving and waving until the last sail was vanished. Now the stars were a colder shore, and no one would see her kerchief if it fluttered. She bent her head and told herself she would not weep.

Harpstrings jingled in the dark. Sir Owain trod forth. He had discarded his crutch, though he still affected a limp. A massy silver chain caught moonlight across his black velvet tunic, and she saw him smile. "Oho," he said softly, "the nymphs and dryads are out!"

"Nay." Despite all resolutions, she felt gladdened. His banter and flattery had lightened so many sad hours; they brought back her courtly girlhood. She fluttered protesting hands, knew she was being coy, but could not stop. "Nay, good knight, this is unseemly."

"Beneath such a sky, and in such a presence, nothing is unseemly," he told her. "For we are assured there is no sin in Paradise."

"Speak not so!" Her pain came back redoubled. "If we have wandered anywhere, 'tis into Hell."

"Wherever my lady is, there is Paradise."

"Is this any place to hold a Court of Love?" she gibed bitterly.

"No." He grew solemn in his turn. "Indeed, a tent—or a log cabin, when they complete it—is no place for her to dwell who commands all hearts. Nor are these marches a fit home for you . . . or your children. You should sit among roses as Queen of Love and Beauty, with a thousand knights breaking lances in your honor and a thousand minstrels singing your charms."

She tried to protest, " 'Twould be enough to see England again—" but her voice would go no further.

He stood gazing into the brook where twin moonpaths glided and shivered. At last he reached beneath his cloak. She saw steel gleam in his hand. An instant she shrank away. But he raised the crosshilt upward and said, in those rich tones he well knew how to use: "By this token of my Saviour and my honor, I swear you shall have your wish!"

His blade sank. He stared at it. She could scarcely hear him when he added, "If you truly wish it."

"What do you mean?" She drew her mantle tight, as if the air were cold. Sir Owain's gaiety was not the hoarse boisterousness of Sir Roger, and his present gravity was more

eloquent than her husband's stammering protestations. Yet briefly she felt afraid of Sir Owain, and would have given all her jewels to see the baron clank from the forest.

"You never say plainly what you mean," she whispered.

He turned a face of disarming boyish ruefulness on her. "Mayhap I never learned the difficult art of blunt speech. But if now I hesitate, 'tis because I am loath to tell my lady that which is hard."

She straightened. For a moment, in the unreal light, he looked strangely like Sir Roger; it was his gesture. Then she was only Catherine, who said with forlorn courage, "Tell me anyhow."

"Branithar can find Terra again," he said.

She was not one to faint. But the stars wavered. She regained awareness leaning against Sir Owain's breast. His arms enclosed her waist and his lips moved along her cheek toward her mouth. She drew a little away, and he did not pursue his kiss. But she felt too weak to leave his embrace.

"I call this hard news," he said, "for reasons I've discussed ere now. Sir Roger will not give up his war."

"But he could send *us* home!" she gasped.

Sir Owain looked bleak. "Think you he will? He needs every human soul to maintain his garrisons and keep up an appearance of strength. You recall what he proclaimed ere the fleet left Tharixan. As soon as a planet seems strongly enough held, he will send for some people of this village, to join those few men he has newly created duke and knights. As for himself . . . oh, aye, he talks of ending England's peril, but has he never spoken of making you a queen?"

She could only sigh, remembering a few words let slip.

"Branithar himself shall explain." Sir Owain whistled.

The Wersgor stepped from a cane brake where he had waited. He could move about freely enough, since he had no hope of escaping the island. His stocky form was well clad in plundered raiment, which glittered as with a thousand tiny pearls. The round, hairless, long-eared, snouted face no longer seemed ugly; the yellow eyes were even gay. By now Catherine could follow his language well enough for him to address her.

"My lady will wonder how I could ever find my way back along a zigzag route taken through swarming uncharted stars," he said. "When the navigator's notes were lost at Ganturath, I myself despaired. So many suns, even of the type of your own, lie within the radius of our cruise, that random search might require a thousand years. This is the more true since nebulosities in space hide numbers of stars until one chances fairly close to them. To be sure, if any deck officers of my ship had survived, they could have narrowed down the search somewhat. But my own work was with the engines. I saw stars only in casual glimpses, and they meant noth-

ing to me. When I tricked your people—rue the day!—all I did was push an emergency control which instructed an automaton to pilot us hither."

A lift of excitement brought back impatience to Catherine. She pulled free of Sir Owain's arms and snapped, "I'm not altogether a fool. My lord respected me enough to try to explain these things to me, however ill I listened. What new have you discovered?"

"Not discovered," said Branithar. "Remembered. 'Tis an idea which should have occurred to me ere now, but there was so much happening—Well.

"Know, then, my lady, that there are certain beacon stars, brilliant enough to be visible throughout the spiral arm of the Via Galactica. They are used in navigation. Thus, if the suns called—by us—Ulovarna, Yariz, and Gratch, are seen to form a certain configuration with respect to each other, one must be in a certain region of space. Even a crude visual estimate of the angles would fix one's position within twenty or so light-years. This is not too large a sphere to find a given yellow-dwarf sun like your own."

She nodded, slowly and thoughtfully. "Aye. Belike you think of bright stars like Sirius and Rigel—"

"The major stars in the sky of a planet may not be the ones I mean," he warned. "They may simply happen to lie close by. Actually, a navigator would need a good sketch of your constellations, with numerous bright stars indicated by color—as seen from airless space. Given enough data, he could analyze and determine which *must* be the beacon giants. Then their relative positions would tell him where they had been observed from."

"I think I could draw the Zodiac for you," said Lady Catherine uncertainly.

"It would be of no use, mistress," Branithar told her. "You have no skill in identifying stellar types by eye. I admit I have little enough: no training at all, merely the casual hearsay about other people's special crafts which one picks up. And while I did chance to be in the control turret once, while our ship was orbiting about Terra making long-range observations, I paid no special heed to the constellations. I have no memory of what they looked like."

Her heart tumbled downward. "But then we're still lost!"

"Not quite so. I should say, I have no conscious memory. Yet we Wersgorix have long known that the mind is composed of more than the self-aware portion."

"True," agreed Catherine wisely. "There is the soul."

"Er . . . that's not exactly what I meant. There is an unconscious or half-conscious depth in the mind, the source of dreams and— Well, anyhow, let it suffice that this unawareness never forgets. It records even the most trivial things which ever impinged on the senses. If I were thrown into a trance and given proper guidance, I could draw quite

an accurate picture of the Terrestrial sky, as glimpsed by myself.

"Then a skilled navigator, his star tables at hand, could winnow this crop with his arts mathematic. It would require time. Many blue stars might be Gratch, for example, and only detailed study could eliminate those which are in an impossible relationship to—shall we say—the globular cluster assumed to be Torgelta. Eventually, however, he would narrow the possibilities down to that smallish region whereof I spoke. Then he could flit thither, with a space pilot to aid him, and they could visit all yellow dwarf stars in the neighborhood until they found Sol."

Catherine smote her hands together. "But this is wonderful!" she cried. "Oh, Branithar, what reward do you wish? My lord will bestow a kingdom on you!"

He planted his thick legs wide, looked up into her shadowed face, and said with the surly valor we had come to know:

"What joy would a kingdom give me, built from the shards of my people's empire? Why should I help find your England again, if it only brings more Englishmen ravening hither?"

She clenched her fists and said with Norman bleakness, "You'll not withhold your knowledge from One-Eyed Hubert."

He shrugged. "The unaware mind is not readily evoked, my lady. Your barbarous tortures might set up an impassable barrier." He reached beneath his tunic. Suddenly a knife gleamed in his hand. "Not that I would endure them. Stand back! Owain gave me this. I know well enough where my own heart lies."

Catherine whirled about with a tiny shriek.

The knight laid both hands on her shoulders. "Hear me before you judge," he said swiftly. "For weeks I've been trying to sound out Branithar. He dropped hints. I dropped hints in turn. We bargained like two Saracen merchants, never openly admitting that we bargained. At last he named that dagger as the price of spreading out his wares for me to see. I could not imagine him harming any of us with it. Even our children now go about with better weapons than a knife. I took it on myself to agree. Then he told me what he has now told you."

The tautness shuddered out of her. She had taken too many shocks in all this time, with too much fear and solitude in between. Her strength was drained.

"What do you require?" she asked.

Branithar ran a thumb along his knife blade, nodded, and sheathed it again. He spoke quite gently. "First, you must obtain a good Wersgor mind-physician. I can find one with the help of this planet's Domesday Book, which is kept at Darova. You can borrow it from the Jairs on some pretext. This physician has to work together with a skilled Wersgor navigator, who can tell him what questions to ask of me and guide my

pencil as I draw the map in my trance. Later we will also need a space pilot; and I insist on a pair of gunners as well. These can also be found somewhere on Tharixan. You can tell your allies you want them to help search out technical secrets of the enemy."

"When you have your star map, what?"

"Well, I shall not turn it freely over to your husband! I suggest that we go secretly aboard your spaceship. There will be a fair balance of power: you humans holding the weapons, we Wersgorix the knowledge. We will stand ready to destroy those notes, and ourselves, if you betray us. At long range, we can haggle with Sir Roger. Your own pleas ought to sway him. If he withdraws from the war, transportation home can be arranged, and our nation will undertake to leave yours alone hereafter."

"If he won't agree?" Her voice remained dull.

Sir Owain leaned close, to whisper in French: "Then you and the children . . . and myself . . . will nonetheless be returned. But Sir Roger must not be told of this, of course."

"I cannot think." She covered her face. "Father in Heaven, I know not what to do!"

"If your folk persist in this lunatic war," Branithar said, "it can only end in their destruction."

Sir Owain had told her the same thing, over and over, all this time when he was the only one of her station on this planet, the only one to whom she could freely talk. She remembered scorched corpses in the fortress ruins; she thought how small Matilda had screamed during the siege of Darova, each time a shell-burst rocked the walls; she thought of green English woods where she had gone hawking with her lord in the first years of their marriage, and of the years he now expected to spend fighting for a goal she could not understand. She lifted her face to the moons, light ran cold along her tears, and she said, "Yes."

XIX.

I cannot tell what drove Sir Owain to his treachery. Two souls had ever striven in his breast; his deepest heart must always have remembered how his mother's people had suffered at the hands of his father's. In part, no doubt, his feelings were truly what he claimed to Catherine: horror at the situation, doubt of our victory, love for her person and concern for her safety. And in part there was a less honorable motive, which may have begun as an idle thought but waxed with time—what might not be done on Terra with a few Wersgor weapons! Reader of my chronicle, when you pray for the souls of Sir Roger and Lady Catherine, say a little word for unhappy Sir Owain Montbelle.

Whatever took place in his secret self, the recreant acted with outward boldness and intelligence. He kept close watch upon the Wersgorix gotten to assist Branithar. During the weeks of their toil, while that which Branithar had forgotten was extracted from his dreams and studied with mathematic devices of more than Arabian cunning, the knight quietly prepared the spaceship to go. And always he must keep up the heart of his fellow conspirator, the baroness.

She wavered in her resolve, wept, stormed, yelled at him to depart her presence. Once a vessel arrived with orders for so-and-so many people to come settle on yet another captured planet. Aboard it was a letter which Sir Roger had sent his wife. He dictated this to me, for his spelling was not always under control, and I took it on myself to polish his phrases a little, so that through their stiffness might come some hint of a humble and enduring love. Catherine at once wrote a reply, admitting her actions and imploring forgiveness. But Sir Owain anticipated this, got the letter ere the ship departed again, burned it and persuaded her to abide by their scheme. It was, he swore, the best for all concerned, even for her lord.

Finally she gave her dwindled village some excuse about joining her husband. She embarked with the children and two maidservants. Sir Owain had learned enough space arts to send the ship to some known, clear destination—a mere matter of pressing the correct buttons—so he could also join them openly. The night before he had smuggled the

Wersgorix aboard: Branithar, the physician, the pilot, the navigator, and a couple of soldiers trained to use those bombards projecting out of the hull.

Those were useless within the ship, where Owain and Catherine bore the only guns. Extra hand weapons were stowed in the clothes chest in her bedchamber, and one maid was always stationed there. The girls were so terrified of the bluefaces that had any attempted to come take a gun, the screaming would have brought Sir Owain in haste.

Nonetheless, knight and lady must watch their associates like wolves. For the obvious thing for Branithar to do was steer to Wersgorixan itself, where he could inform the emperor of Terra's location. With all England a hostage, Sir Roger must submit. Even the knowledge that we were not from a great space-traveling civilization, but simple and innocent Christian folk, mere lambs led to this slaughter, would have so heartened the Wersgorix and demoralized our allies, that Branithar must on no account be allowed to communicate the secret.

Not until Sir Owain's plans had reached fruition. Perhaps never. I am sure Branithar himself foresaw a certain awkwardness at the moment when he had deposited his human comrade on English soil. No doubt he made his own devious plans against it. But for the present, their interests ran in the same channel.

These considerations alone will disprove certain sniggering canards about Lady Catherine. She and Sir Owain dared never be at ease simultaneously. They must stand watch on watch, gun at hip, the entire voyage, lest their crew overwhelm them. It was the most effective chaperonage in history. Not that she would have misbehaved in any event. Confused and frightened she might become, but she was never faithless.

Sir Owain felt reasonably confident that Branithar's data were honest. But he insisted on proof. The boat flew for some ten days, to the indicated region of space. Another couple of weeks were spent casting about, examining various hopeful stars. I shall not try to chronicle what the humans felt, as constellations gradually became familiar again; nor that single aerial glimpse which their bargain with distrustful Branithar vouchsafed them, when Dover castle fluttered its pennons above white cliffs. I do not believe they ever spoke about it.

Their ship screamed from atmosphere and lined out again for the hostile stars.

XX.

Sir Roger had established himself on the planet we named New Avalon. Our folk needed a rest, and he needed time to settle many questions of securing that vast kingdom which had already fallen to him. He was furthermore in secret negotiation with the Wersgor governor of an entire star cluster. This person seemed willing to yield up all he controlled,

could we give him suitable bribes and guarantees. The haggling went slowly, but Sir Roger felt confident of its outcome.

"They know so little about the detection and use of traitors out here," he remarked to me, "that I can buy this fellow for less than an Italian city. Our allies never attempted this, for they imagined that the Wersgor nation must be as solid as their own. Yet isn't it logic, that so vast a sprawl of estates, separated by days and weeks of travel, must in many ways resemble a European country? Though even more corruptible—"

"Since they lack the True Faith," I said.

"Hm-m-m, well, yes, no doubt. Though I've never found Christians who refused a bribe on religious grounds. I was thinking, that the Wersgor type of government commands no fealty."

At any rate, we had a little while of peace, camped in a dale beneath dizzyingly tall cliffs. A waterfall rushed arrowstraight into a lake more clear than glass, ringed with trees. Even our sprawling, brawling English camp could not hurt so much beauty.

I had settled down outside my own little tent, at ease in a rustic chair. My hard studies laid aside for a moment, I indulged myself with a book from home, a relaxing chronicle of the miracles of St. Cosmas. As if from far off, I heard the crackle of fire-gun practice, the *zap* of archery, the cheerful clatter of quarterstaff play. I was almost asleep, when feet thudded to a halt beside me.

Startled, I blinked upward at the terrified face of a baronial esquire. "Brother Parvus!" he said. "In God's name, come at once!"

"Ugh, uh, whoof?" I said in my drowsiness.

"Exactly," he groaned.

I gathered my cassock and trotted at his heels. Sunlight and blossoming bowers and birdsong overhead were suddenly remote. I knew only the leap of my heart and the realization of how few and weak and far from home we were. "What's awry?"

"I know not," said the esquire. "A message came on the far-speaker, relayed from space by one of our patrol ships. Sir Owain Montbelle desired private talk with my lord. I know not what was spoken on the narrow beam. But Sir Roger came staggering out like a blind man, and roared for you. Oh, Brother Parvus, it was horrible to see!"

I thought that I should pray for us all, doomed if the baron's strength and cunning could not longer uphold us. But I was at once too full of pity for him alone. He had borne too much, too long, with never a soul to share the burden. All brave saints, I thought, stand by him now.

Red John Hameward mounted guard outside the portable Jair shelter. He had spied his master's stricken-ness, and dashed thither from the target range. With strung bow, he bellowed at the crowd that milled and muttered: "Get you back! Back

to your places! God's death, I'll put this arrow through the first by-our-lady sod to pester my lord, and break the by-our-lady neck o' the next! Go, I say!"

I brushed the giant aside and entered. It was hot within the shelter. Sunlight filtered through its translucency had a thick color. Mostly it was furnished with homely things, leather, tapestry, armor. But one shelf held instruments of alien manufacture, and a large far-speaker set was placed on the floor.

Sir Roger slumped in a chair before this, chin on breast, his big hands hanging limp. I stole up behind him and laid my own hand on his shoulder. "What is the matter, sire?" I asked, as softly as might be.

He hardly moved. "Go away," he said.

"You called for me."

"I knew not what I was doing. This is between myself and— Go away."

His voice was flat, but it took my whole small stock of courage to walk around in front of him and say, "I presume your receiver inscribed the message as usual?"

"Aye. No doubt. I'd best wipe out that record."

"No."

His gray gaze lifted toward me. I remembered a wolf I had once seen trapped, when the townsfolk closed in to make an end of it. "I don't want to harm you, Brother Parvus," he said.

"Then don't," I answered brusquely, and stooped to turn on the playback.

He gathered his powers, in great weariness. "If you see that message," he warned, "I must kill you for my honor."

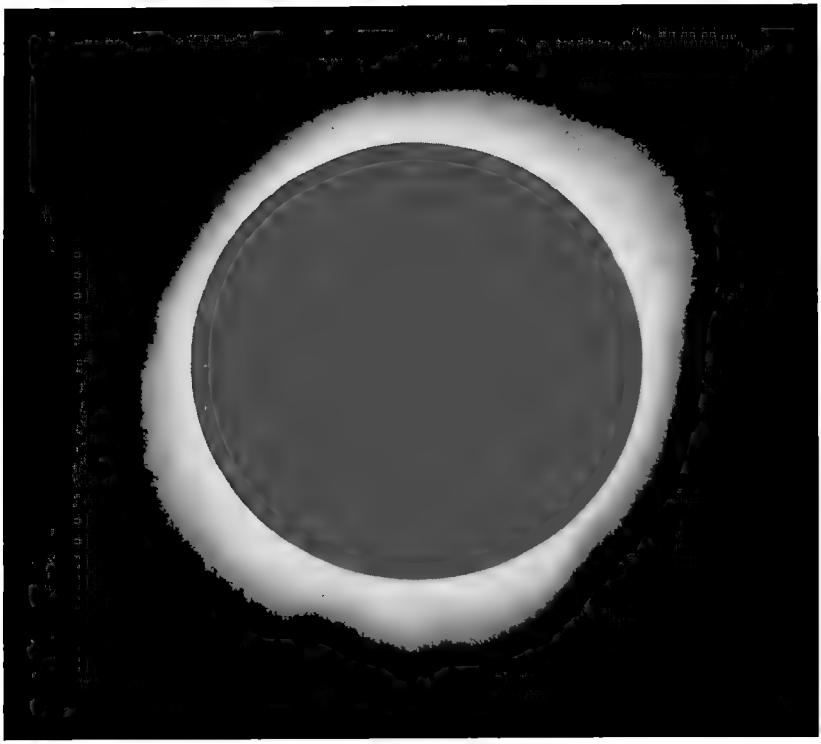
I thought back to my boyhood. There had been various short, pungent, purely English words in common use. I selected one and pronounced it. From the corner of an eye, as I squatted by the dials, I saw his jaw fall. He sank back into his chair. I pronounced another English word for good measure.

"Your honor lies in the well-being of your people," I added. "You're not fit to judge anything which can so shake you as this. Sit down and let me hear it."

He huddled into himself. I turned a switch. Sir Owain's face leaped into the screen. I saw that he was also gaunt, the handsomeness less evident, the eyes dry and burning. He spoke in formal, courteous wise, but could not hide his exultation.

I cannot remember his exact words. Nor do they matter. He told his lord what had happened. He was now in space, with the stolen ship. He had approached close to New Avalon to beam this call, but taken to his heels again immediately it was spoken. There was no hope of finding him in that vastness. If we yielded, he said, he would arrange the transportation home of our folk, and Branithar assured him the Wersgor emperor would promise to keep hands off Terra. If we did not yield, the recreant

(*Continued on page* 163)



Courtesy of the American Museum of Natural History

THE MATTER OF SPACE

Even the visible atmosphere of Sol is much more extensive than the disk of the photosphere would indicate. But the corona is visible only when the glare of the photosphere is blocked out. And the invisible atmosphere. . . . . ?

By ISAAC ASIMOV

The planets can be distinguished from stars because, in a telescope, they present clearly defined disks, while a star remains a point of light. But—as it happens, both appearances are purely optical illusions!

IT'S AMAZING how odd things may turn out if you take some simple, self-evident, axiomatic statement and look into it a little.

For instance, the sun is hot, isn't it? Sure it is! Its surface temperature is about 6,000° C. which is high enough to convert all known substance to vapor. And beneath the solar surface, the temperature rises progressively until at the center it is at least 10,000,000° C.

Well, then, since that's admitted, it must follow that to maintain such hellish temperatures—far more hellish than any Dante ever imagined, I'm sure—the sun must be producing and emitting a great deal of energy constantly. Isn't that obvious?

Every second it produces 3,800,000,000,000,000,000,000,000,000,000—3.8×10^{33}—ergs of energy. The erg is a small unit of energy, of course, but this is indeed the tremendous quantity of energy production one would expect. After all, hydrogen atoms are fusing constantly to helium inside the sun, which is thus a gigantic hydrogen bomb, kept from wildly exploding once and for all by its own gravitational forces.

To make what would undoubtedly seem like a ridiculous comparison, the sun produces a great deal more energy in its nuclear furnace than you do with the puny chemical forces at your body's disposal. There's no doubt about that either, is there?

The average human body carrying on in a typical sedentary occupation delivers to its environment about 2,500 kilocalories a day, which comes out to about a hundred trillion ergs, or 1,200,000,000 ergs per second. This is—as we should naturally expect—laughably and ridiculously small compared to the sun's mighty output.

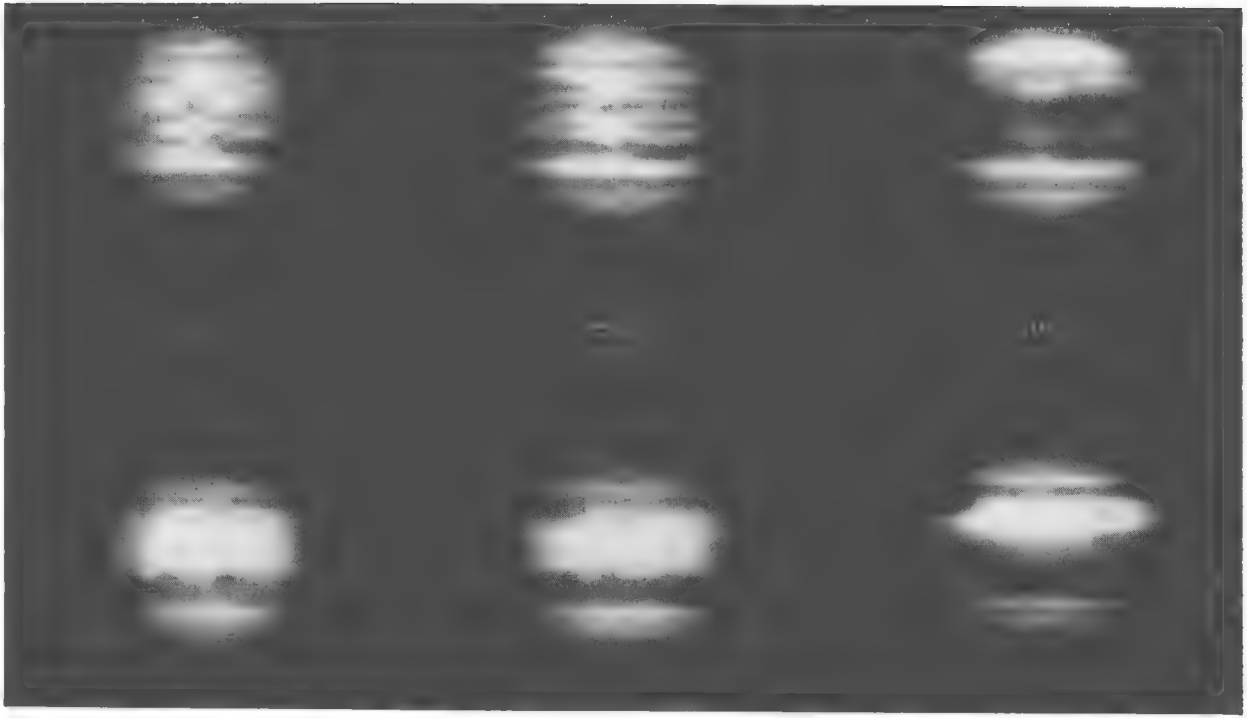
Except for one thing—

The sun is a lot more massive than a human being. Perhaps we ought to allow for that, and work out heat production on a per kilogram basis. Let's put the weight of our average man at 70 kilograms—roughly 150 pounds. Now we can say that the human body, producing heat by chemical reactions, delivers 17,000,000 ergs per second per kilogram.

What about the sun? Its total mass is 1.99×10^{30} kilograms, which brings its energy production, based on nuclear reactions, to 1,900 ergs per second per kilogram.

Now that deserves several exclamation points. After all those obvious facts about how hot the sun is and how much heat it produces and what a tremendous nuclear furnace it is, it turns out that after all the human body is actually producing and radiating energy at a rate nine thousand times as great as an equal mass of average sun-substance. The chemical reactions in your body, weight for weight, produce nine thousand times the amount of energy per second that the nuclear reactions in the sun's unbelievable interior do.

Put it still another way. If a number of human beings equal in mass to the sun, could be substituted for the sun, kept alive somehow, and if all



Courtesy of the Lowell Observatory, Flagstaff, Arizona.

The extent of the "visible surface" of a planet isn't a fixed quantity either. It depends entirely on the wave length of the light reflected from that "surface." The apparent diameter of Jupiter can be varied by picking your color carefully.

the energy they produced could be radiated away as fast as produced, then the earth would receive enough heat to boil the oceans away and destroy life.

It seems like a paradox, but there is a gimmick in the preceding sentence. I said "if all the energy they produced could be radiated away as fast as produced." That is exactly the catch. It can't be.

Any heat-producing body can lose heat to the universe about it only at its surface—where it makes contact with the cooler environment. Our average 70-kilogram human body will, if we further assume a height of five feet eight inches, have a surface area of about 18,000 square centimeters. Each kilogram of the body will have about 260 square centimeters through which to lose its heat.

As a heat-producing body grows larger, however, and more massive, its bulk—and heat-producing capacity—increases as the cube of its linear dimension, while its surface—and heat-losing capacity—increases only as the square. The sun has about 3×10^{28} as much mass as you have, but it only has about 3×10^{18} as much surface. Weight for weight, you have ten billion times as much surface as the sun has. Each kilogram of the sun's mass has not quite 0.00000003 square centimeters through which to lose its heat.

The result is that the sun doesn't lose its heat very well. It stores it. The heat produced in the interior spends such a long time finding its way to the distant surface and competing with other heat, so to speak, for a chance to get lost through it, that by the time it has done so, enough additional heat has piled up behind it to raise the temperature of the solar interior to millions of degrees.

In the end so much heat is stored in the sun that an equilibrium is reached at a point where 64,000,000,000 ergs are being radiated each second out of every square centimeter of the sun's comparatively microscopic surface. In comparison, our tiny bulk can only supply our comparatively vast surface area with an output of 67,000 ergs per second for each square centimeter. No wonder the sun's surface will boil tungsten, while our own surface is merely pleasantly warm to the touch.

Let's consider another aspect of the sun—its distance. There seems no doubt that it is far, far away. The mean distance from the Earth to the sun is usually given as 93,000,000 miles or, if you prefer, 150,000,000 kilometers.

Of course, and this is hardly ever mentioned, this distance is center to center; from the center of the Earth to the center of the sun; and *not* surface to surface.

This might seem like a quibble. The radius of the Earth, as usually given, is 6,370 kilometers and the radius of the sun is 695,500 kilometers. Subtract the sum of these from the center-to-center distance and you have 149,300,000 kilometers as the

distance from the Earth to the sun surface-to-surface.

This seems scarcely worth making a fuss about. So we can drop that and raise another point which may seem even less worth making a fuss about. Just what do we mean by the surface of an astronomical object, anyway?

Actually, what we commonly mean is the boundary of the body as etched against the surrounding space. It is something we *see*.

If we begin by talking about a body like the moon, there seems no possible ambiguity in going by what we see. The curved surface of the moon stands etched against the blackness of space and at that surface there is a sudden transition from the solid matter of the moon to the emptiness of space.

With the Earth, matters are a little more complicated. What we call the surface of the earth is merely the surface of the solid and liquid portion of the globe. The surface of the Earth, commonly so-called, is not a transition between matter and vacuum, but between one kind of matter—soil or water—and another kind—air. We are surrounded by the atmosphere which forms an integral portion of the planet, firmly held to it by gravitation, and traveling with it wherever it goes.

To be sure, the atmosphere is such a small part of the Earth that we might feel justified in ignoring it. Its density at sea-level is 1.3 milligrams per milliliter which is only about 1/800 the density of water and only 1/2200 the average density of the Earth's crust. It's nothing but a wisp. Its total mass is 5.2×10^{18} kilograms, which sounds like a lot but is only about one-millionth the total mass of the Earth.

Why not ignore it? And we do, usually.

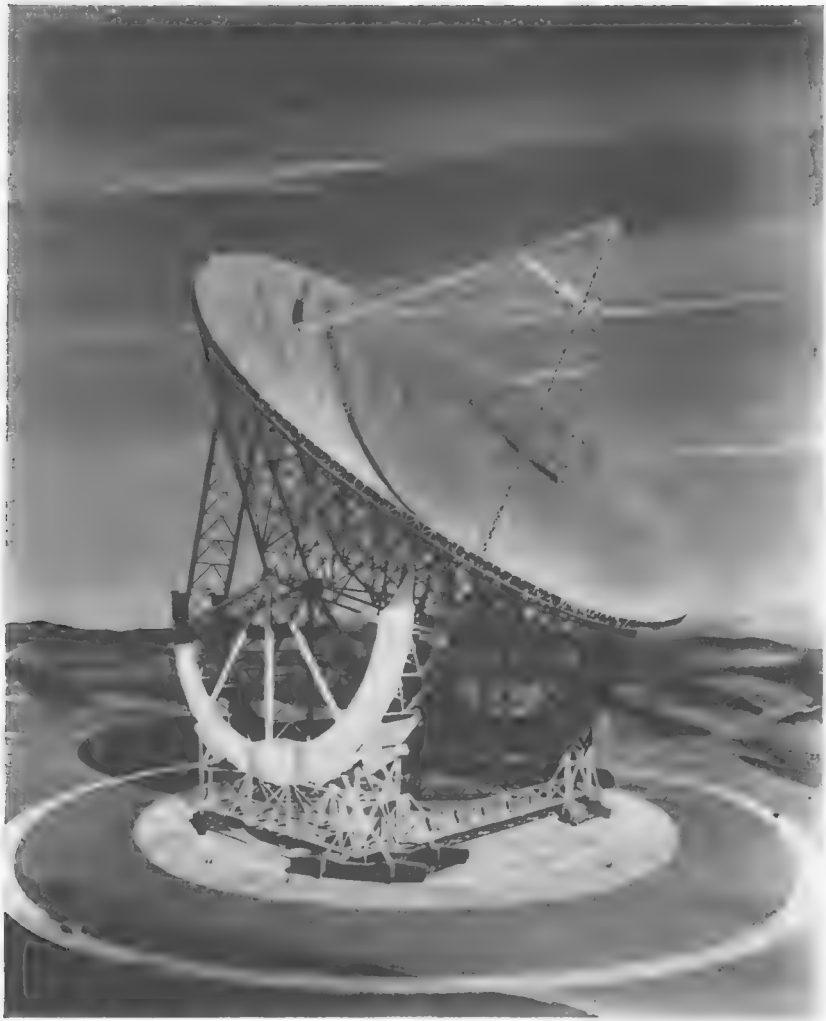
Yet its small density and low mass are not the reasons we ignore it. We do not consider the Earth's atmosphere as part of the Earth in calculating out such vital statistics as Earth's diameter and volume, only because we cannot see it and for no other reason. The proof of that is that where we deal with planets that have visible atmospheres, we promptly count it in for all calculations of diameter and volume.

This is most notoriously so in the case of the outer planets. In Table 1, I present some statistics on them.

TABLE 1

Planet	Overall diameter (kilometers)	Volume (Earth=1)	Mass (Earth=1)
Jupiter	143,000	1,300	318
Saturn	121,000	750	95
Uranus	50,000	60	15
Neptune	49,000	58	17

It is certain that what we insistently speak of as the surface of Jupiter, for instance, is nothing more than the opaque upper region of an atmosphere. The markings are impermanent. The equatorial region rotates more rapidly than regions removed from the equator and so on. Above all, the outer planets are surprisingly non-massive for their bulk, which is another way of saying they have low densities. The overall density of Sat-



Courtesy of the U. S. Navy

An artist's conception of the six-hundred-foot radio telescope now being built in Sugar Grove, West Virginia. It permits observing a part of the radiation spectrum heretofore unattainable.

urn particularly is only 0.7—less than that of water. Presumably these low densities are a result of the fact that we are counting in voluminous atmospheres as part of the planetary bulk—a courtesy we do not allow the Earth.

Some astronomers have speculated that deep down, each outer planet has a core of rock and metal, corresponding to Earth's lithosphere, and a shell of deep-frozen ice, corresponding to Earth's oceans. It is then possible to make estimates of how deep the atmosphere would have to be to allow for the final density. The oblateness of the planet will also tell something of the distribution of mass and that can be thrown into the mathematical pot as well. One widely known estimate arrived at in this fashion is that the atmosphere of Jupiter is 13,000 kilometers deep with corresponding figures for Saturn, Uranus and Neptune of 13,000, 5,000 and 3,000 kilometers. From this we can prepare Table 2.

TABLE 2

Planet	Estimated diameter of solid core (kilometers)	Estimated volume of solid core (Earth=1)
Jupiter	117,000	800
Saturn	95,000	420
Uranus	40,000	32
Neptune	43,000	39

Comparing Tables 1 and 2, you can see that the bulk of the solid core has been cut nearly in half as compared with the planet as a whole. Yet after including so much atmosphere in with the planet itself we don't include the volume of gas which must undoubtedly exist above the opaque layer of Jupiter's—and the others'—gaseous "surface".

It all boils down to the fact that what we see as the surface, we call the surface, whether it is solid, liquid or gaseous. And it may seem to you that after all, this is good enough. It removes ambiguity.

But does it?

Consider the sun. The density of the sun is, on the average, 1.41 grams per cubic centimeter, which is about the density of coal. Despite this, the sun is a gas throughout. Even the central core of the sun, where the density reaches as high as 100 grams per cubic centimeter—five times the density of gold—the sun-material is a gas. The reason for that is that the atoms have broken down and we are dealing with a conglomeration not of atoms, but of much, much smaller subatomic particles. Most of the sun, in fact, is not really a gas, but what we call today a "plasma."

In other words, the sun has no surface at all, in our ordinary earthly use of the word. It is all atmosphere.

But it does have a visible surface, etched sharply against the surrounding space. This is the glowing photosphere. This photospheric surface of the sun is not only gas, it is extremely rarefied gas, with a density of 0.00000001 grams per cubic centimeter. That is about as dense as our own atmosphere is at a height of 50 miles. We wouldn't consider our own atmosphere at that height a "surface," but we consider the solar atmosphere of

the same density a "surface" just because it radiates and is visible.

Still no ambiguity.

Well, once in a while, the photosphere is blanked out by an eclipse of the moon—which, through a piece of unbelievable good fortune, is just about equal to the sun in apparent size. Then, what is commonly called the sun's atmosphere—those gases lying above the photosphere—comes into view. It is radiating also, eclipse or not, but its light is ordinarily blanked out by the much more strongly radiating photosphere.

Since the visible atmosphere can be made out, during an eclipse for distances as great as 14,000,000 kilometers from the sun's center, ought we not consider the sun as a body 28,000,000 kilometers in diameter? The fact that we don't may be entirely an accident of our sensory make-up. If we could see radio waves or X rays, the sun would indeed seem much larger than it is, and, what's more, would expand and contract and take on odd changes according to the type of activity going on within it.

The mention of X rays brings up the interesting question as to why the sun should be radiating them at all. It isn't hot enough. And yet X rays are emitted as we now know through rocket observations.

And, indeed, they're not from the sun as we usually think of it. They are from the corona. The temperature of the corona is almost as high as that of the sun's center; it is undoubtedly higher than 1,000,000° and very probably much higher.

The temperature is an expression of the energy content of the thin gas that composes the corona and that, apparently, is derived from the churning of the solar surface beneath it. This churning in the sun proper sets up vibrations equivalent to sound waves. These travel through the atmosphere as sound does on Earth and the energy content is distributed among fewer and fewer particles as the atmosphere grows thinner. To me, this is analogous to the manner in which the wave of motion along a bull-whip speeds as the whip becomes thinner until the end cracks at supersonic speeds.

The bull-whip crack that lashes the particles of the corona into the million degree range of temperature completely ionizes the atoms composing it—which are mostly hydrogen—into free protons and electrons, and imparts enough energy to them to allow the emission of X rays. It seems clear then that the corona is not only a part of the sun; but that it is a part that cannot be dismissed as just a thin gas of no significance. Its emission of X rays alone is bound to have an important effect on surrounding space.

But if we are going to include the corona as part of the sun, then the surface of the sun should be placed at the end of the corona, and this raises the embarrassing question of where the end of the corona is. We can only see it out so far, but just because we can't see beyond that far, doesn't mean the corona has stopped; it has just become too faint to see.

American Museum–Hayden Planetarium

When high-velocity ionized particles in the sun's atmosphere interact with those of Earth's, the resulting energy display can be fantastically beautiful. Trouble is the Earth's magnetic field focuses most of those particles on the poles, so the aurorae aren't often seen in southern latitudes.

Might it not be that the question of where the end of the corona can be found is meaningless? What if it just gets thinner and thinner but never fades to zero. Then there is no end at all, is there?

Fortunately, there's no reason that we need accept zero; a complete and perfect vacuum; as the limit of the corona. For one thing, complete and perfect vacuum does not exist.

Instead, let us compare the corona with empty space—the kind of space that exists where no astronomical body is closer than a light-year, say. In such interstellar space, it is estimated that the density of particles is equal to the equivalent of about ten hydrogen atoms per cubic centimeter. While this is not perfect vacuum, it is a pretty good imitation, considering that the number of particles in Earth's atmosphere at sea level is equivalent to 1,600,000,000,000,000,000,000 particles—i.e. protons, neutrons and electrons—per cubic centimeter.

The base of the solar atmosphere, where it touches the photosphere, so to speak, is not as dense as the base of the Earth's atmosphere, the number of particles is roughly 12,000,000,000,000,000. About three hundred thousand kilometers above the photosphere, the number has dropped to some 60,000,000 per cubic centimeter.

At the edge of the visible corona, about fourteen million kilometers above the photosphere, the number is down to 6,000 per cubic centimeter.

The number continues dropping, but even at a distance equivalent to the Earth's orbit, there are still 200 particles per cubic centimeter at least and perhaps as many as 1,000.

Although this is tremendously thin as gas densities go, at least if we think of the range of gas densities to which we are accustomed on Earth, it is one or two orders of magnitude higher than the particle density in interstellar space. A space-traveler entering our system from without and unequipped to detect any form of electromagnetic radiation at all, but with a device that could measure particle density in space would detect a significant rise and know he was in the neighborhood of a star long before he had reached Earth's orbit.

If we define the sun's atmosphere as all the gas in that volume of space, centered at the sun, within which the gas density is higher than that in interstellar space, then it can only be concluded that the solar atmosphere extends beyond Earth's orbit.

And if the corona is accepted as an integral part of the sun, we can now take a new look at the question I earlier asked: how far is the Earth from the sun, surface to surface? The answer is zero. The Earth—to say nothing of Venus and Mercury—circles in an orbit within the sun's corona. We are inside the sun right now.

If being inside the sun gives you an unpleasant notion of being immersed in high temperature, you happen to be right. The temperature drops as you travel outward along the corona from the center of the sun because some of the energy of the particles is given up to cooler—i.e. less energetic particles—that happen to be moving in from the outer reaches of the system. It is nevertheless estimated that even at the distance of Earth's orbit, the temperature of the corona is 100,000°.

And if you wonder how that can be, and why the Earth does not vaporize, the answer is that temperature and heat are two different things. Temperature is the measure of the average energy content of the individual particles in a mass of matter. Heat is a measure of the total energy content of those particles. The particles of the corona are individually energetic certainly, but there are so few of them, in comparison to the number of particles in an equal volume of the Earth, or even of the Earth's lower atmosphere, that the total energy—the heat content—is low.

If you visualize those energetic coronal particles striking our atmosphere, their energy is distributed

among so many trillions of particles for every striking particle that little effect is to be noticed, at least as far as Earth's surface temperature is concerned.

But what about the Earth's atmosphere, by the way. According to recent rocket experiments, a thousand kilometers above Earth's surface, the density of the atmosphere is down to about 12,000,000 particles per cubic centimeter.

Now the thousand kilometer mark is usually taken as the edge of the exosphere, the outermost portion of the Earth's atmosphere, and beyond that point is what is usually called "outer space" in newspaper articles. There is some reason for this. By the time the atmosphere thins out to the thousand kilometer level, there is so much space between the atoms as compared with the size of each atom that there are no longer a significant number of atomic collisions.

It is the frequent, repeated collisions of one gas molecule with another that allow gases to behave as continuous media. Above the thousand kilometer mark, the atmosphere no longer behaves as a continuous medium but as a collection of almost independent particles. It becomes a kind of sub-submicroscopic planetoid belt encircling the Earth, each atom or ion following its own orbit.

And yet the density of particles even at the exosphere limit is still five or six orders of magnitude higher than that in interstellar space and even ten thousand time or so as dense as the coronal particles in the neighborhood of the Earth. Therefore, for a considerable distance beyond the exosphere limit, space must be occupied most clearly and definitely by Earth's atmosphere.

We cannot expect Earth's atmosphere ever to decline to interstellar densities, but it can decline to coronal densities, anyway. In other words, there will come a point where the Earth's atmosphere will melt into the general solar atmosphere, and the question only remains as to where that point will be.

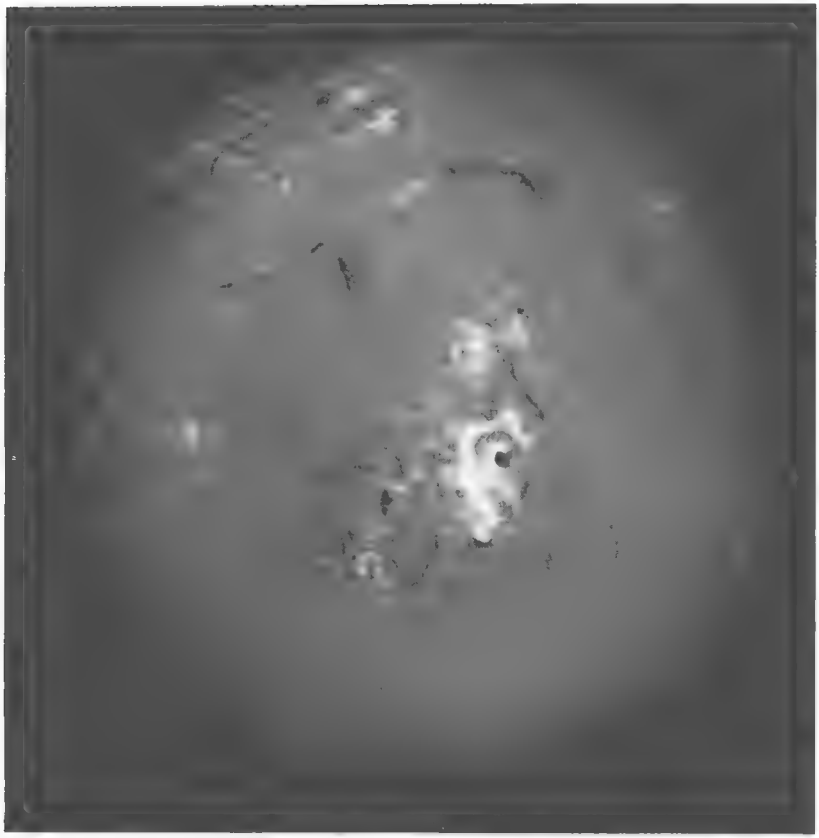
Actually, once we get above the lower skin of the atmosphere, its temperature starts to rise. The beginnings of the rise have been measured. At 500 kilometers above Earth's surface, it is 1200° C. and rising several degrees for each kilometer increase in height. At a height of 6,000 kilometers, the rise may have slowed to a degree or even less per kilometer but it is still going up.

Presumably, this is not so much a rise in temperature with increasing height as a fall in temperature with decreasing height. The far-out edge of the atmosphere is being warmed by the coronal temperatures, and as height decreases and the number of particles per cubic centimeter increases, the energy is shared among more and more and the temperature drops.

If we can estimate how far out in space, the temperature of Earth's atmosphere reaches the coronal temperature of 100,000° C. then we can say that at that point the Earth's at-

Sacramento Peak Observatory & Harvard College Observatory

Since solar flares follow the lines of magnetic force, it follows that they must display polarity. North and south magnetic poles are easily discernible in a Phoenix-eye view of a flare on Sol's surface....



Sacramento Peak Observatory & Harvard College Observatory

. . . And, even when the majority of the photosphere is reduced to a gray background, the energy content of a flare stands out.

mosphere melts into the corona. This distance has been calculated to be roughly 450,000 kilometers away. To give you an idea of what this means, the moon is, on the average, 380,000 kilometers from the Earth. Therefore, just as the Earth is revolving in an orbit inside the solar atmosphere, so the moon is revolving in an orbit inside the terrestrial atmosphere.

In fact, to complete the picture, if we are going to define an atmos-

phere as any volume of gas that has a density greater than interstellar gas, then the moon itself most definitely has an atmosphere. Radio waves skimming the surface of the moon, on their way from outer space to us are sufficiently interfered with to allow an estimation that the density of charged particles near the—solid—surface of the moon yields about a ten-trillionth of the pressure of our own atmosphere. That means the moon sports an atmosphere containing 160,000,000,000 particles to the cubic centimeter, which is millions of times as high as the particle density of either Earth's atmosphere, or the corona in its own neighborhood.

I don't know exactly where the moon's atmosphere melts into ours, but I'd guess it was some few thousands of miles above the moon's surface.

It would seem then that the inner portion of the Solar system, say inside the orbit of Mars, is one voluminous atmosphere. It may seem too thin to bother with, but its total mass compares favorably with the Earth's atmosphere proper and, in interplanetary travel it is something to be reckoned with.

An atmosphere wouldn't be an atmosphere without weather of some sort and the "interplanetary atmosphere" has just that.

The temperature of a mass of particles is reflected in the average velocity of those particles. Thus, the atmosphere about us has an average temperature of 300° K, and the average molecule in our vicinity is moving at a speed of something like 0.5 kilometers per second.

At coronal temperatures, the speeds are much higher. Out here at the Earth's orbit the particles are thought to be moving at speeds up to 500 kilometers a second, day in and day out.

Furthermore, they are not moving randomly in all directions. The particles heading from the sun outward and originating, therefore, under conditions of high temperature are moving much more quickly than particles heading from the outer regions toward the sun and originating, therefore, under conditions of low temperature. The overall motion is, consequently, out from the sun in all directions, at high velocity, and in a constant flow.

It is as though there were a wind blowing outward from the sun, not just a flood of radiation, but a material wind precisely like that in our own atmosphere in nature, even though it is a much, more rarefied one. And, in fact, the phenomenon is referred to as the "solar wind."

This wind slams against the Earth itself but, since it consists of charged particles, is deflected by Earth's magnetic lines of force, sliding back and forth while more pile on behind them. North and south, where the magnetic lines of force dip toward the Earth surface at the magnetic poles, the particles of the solar wind strike our upper atmosphere and bring on the auroras. Out in the equatorial region, however, they re-

The exact nature of the Zodiacal Light hasn't been determined yet. Visible along the plane of the ecliptic only when both the photosphere and the corona have been blocked from view, it may be composed of ionized particles or of micrometeors reflecting sunlight. Whatever it is, it is well within the outer limits of Sol's atmosphere.

American Museum–Hayden Planetarium

main piled up some 16,000 to 20,000 kilometers above the surface. Now the solar wind acts as though it were a snowstorm with the snow drifting high against a barrier; and this high "snowdrift" is the outer Van Allen radiation belt.

So now it would seem that the solar wind can be dangerous indeed to space travelers. The particles are few in outer space, when compared with the vast bombardment of particles against us in our own atmosphere. But if the outer space particles are few, they are energetic, and to go into outer space, is like exchanging a walk through a thick snowstorm, for a walk through emptiness, where occasionally, a thin, thin needle comes flying toward you.

In the solar wind itself, in its ordinary state of dilution, the danger is very small, but among the high "drifts" in the radiation belt, things are deadly.

Worse still, if there are winds and drifts, there are also gales and hurricanes. A discussion of that also brings up the point of where the corona comes from. If the thin gas that makes it up is hurrying outward from the sun at hundreds of kilometers an hour, why is it not all gone long ago?

Obviously, it must be renewed.

It is as though the sun were in a continual state of rebellion at the miserably small extent of its surface; as though it were always trying to push energy through it, finding insufficient room, and getting violent as a result.

At least every once in a while, generally in connection with sunspot activity, matter, glowing brilliantly, moves up through the solar atmosphere. It moves at great velocities and sometimes attains great heights. These solar flares, which is what they are called, spray particles into outer space.

If they happen to rise from the solar surface in a direction that is more or less on a line with the Earth, the spray of protons reaches us and disrupts radio communication. The solar wind may reach speeds up to 1500 kilometers per hour at such times.

The sun is always flaring here and there and undoubtedly the corona is constantly renewed by means of the particles spewed out at such times. Occasionally, there is a giant flare, such as one, notably, which took place on February 23, 1956 and expended a total energy of something close to 10^{33} ergs, in a quarter-hour or so.

This is more energy than the entire solar atmosphere possesses. It is a quarter seconds worth of the entire solar output. If the flare had drained energy from the surrounding photosphere to supply itself, it would have dimmed the sun, just as, in the old movies, the turning on of the juice in the electric chair would dim the lights in the death's row cells. Actually, the flare does no such thing. Instead the energy is apparently drawn from the amount stored in the

magnetic field associated with the spots. When the field collapses—only in part, presumably—the energy that had been stored in it is released and jets solar material upward, sending the temperature of the corona above it sky-rocketing and emitting a shower of protons.

The particles emitted in a really huge flare are energetic enough, on occasion, to penetrate the atmosphere and actually strike the surface of the Earth. It is curious to think that it is quite possible that some of the matter in ourselves even—a hydrogen atom or so here or there, or an electron perhaps—might have been solar matter, floating around in a sunspot—not five billion years ago, but a few days ago.

The solar wind, you see, isn't just theory. It's a highly material thing that affects Earth's weather and therefore our lives, and it will affect Homo astronauticus even more.

I don't know of any science-fiction story that has had the skipper of a space ferry reading up on the weather reports, but why not? He might be interested in the details of the wind before setting out; the solar wind, that is.

THE END

THE ANALYTICAL LABORATORY

Two issues to be reported on this time—the An Lab gets squeezed out now and then, since it's one of the few adjustable factors between rigid type-metal and rigid pages-available.

May, 1960 Issue

PLACE	STORY	AUTHOR	POINTS
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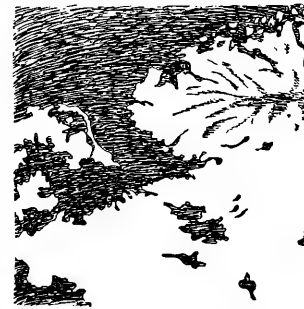
The June issue carried the Dean Drive article—which, understandably, aroused considerable mail; articles, however, aren't included in the ratings.

THE EDITOR.

BARNACLE BULL

By WINSTON P. SANDERS



THE Hellik Olav was well past Mars, acceleration ended, free-falling into the Asteroid Belt on a long elliptical orbit, when the interior radiation count began to rise. It wasn't serious, and worried none of the four men aboard. They had been so worried all along that a little extra ionization didn't seem to matter.

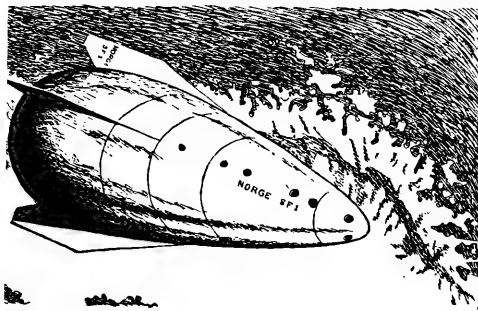
But as the days passed, the Geigers got still more noisy.

And then the radio quit.

This was bad! No more tapes were being made of signals received—Earth to one of the artificial satellites to Phobos to a cone of space which a rather smug-looking computer insisted held the *Hellik Olav*—for later study by electronics engineers. As for the men, they were suddenly bereft of their favorite programs. Adam Langnes, captain, no longer got the beeps whose distortions gave him an idea of exterior conditions and whose Doppler frequency gave him a check on his velocity. Torvald Winge astronomer, had no answers to his requests for data omitted from his handbook and computations too elaborate for the ship's digital. Per Helledahl, physicist, heard no more sentimental folk songs nor the recorded babblings of his youngest child. And Erik Bull, engineer, couldn't get the cowboy music sent from the American radio satellite. He couldn't even get the Russians' Progressive jazz.

Furthermore, and still more ominous, the ship's transmitter also stopped working.

Aside from other admirable features, this story has science-fiction's first legitimate explanation for space barnacles!



Illustrated by Van Dongen

Helledahl turned from its disassembled guts. Despite all he could do with racks, bags, magnetic boards, he was surrounded by a zero gravity halo of wires, resistances, transistors, and other small objects. His moon face peered through it with an unwonted grimness. "I can find nothing wrong," he said. "The trouble must be outside, in the boom."

Captain Langnes, tall and gaunt and stiff of manner, adjusted his monocle. "I dare say we can repair the trouble," he said. "Can't be too serious, can it?"

"It can like the devil, if the radar goes out too," snapped Helledahl.

"Oh, heavens!" exclaimed Winge. His mild, middle-aged features registered dismay. "If I can't maintain my meteorite count, what am I out here for?"

"If we can't detect the big meteorites in time for the autopilot to jerk us off a collision course, you won't be out here very long," said Bull. "None of us will, except as scrap metal and frozen hamburger."

Helledahl winced. "Must you, Erik?"

"Your attitude is undesirable, Herr Bull," Captain Langnes chided. "Never forget, gentlemen, the four of us, crowded into one small vessel

for possibly two years, under extremely hazardous conditions, can only survive by maintaining order, self-respect, morale."

"How can I forget?" muttered Bull. "You repeat it every thirty-seven hours and fourteen minutes by the clock." But he didn't mutter very loudly.

"You had best have a look outside, Herr Bull," went on the captain.

"I was afraid it'd come to that," said the engineer dismally. "Hang on, boys, here we go again."

Putting on space armor is a tedious job at best, requiring much assistance. In a cramped air-lock chamber—for lack of another place—and under free fall, it gets so exasperating that one forgets any element of emergency. By the time he was through the outer valve, Bull had invented three new verbal obscenities, the best of which took four minutes to enunciate.

He was a big, blocky, redhaired and freckle-faced young man, who hadn't wanted to come on this expedition. It was just a miserable series of accidents, he thought. As a boy, standing at a grisly hour on a cliff above the Sognefjord to watch the first Sputnik rise, he had decided to be a spaceship engineer. As a youth, he got a scholarship to the Massachusetts Institute of Technology, and afterward worked for two years on American interplanetary projects. Returning home, he found himself one of the few Norwegians with that kind of experience. But he also found himself thoroughly tired of it. The cramped quarters, tight discipline, reconstituted food and reconstituted air and reconstituted conversation, were bad enough. The innumerable petty nuisances of weightlessness, especially the hours a day spent doing ridiculous exercises lest his very bones atrophy, were worse. The exclusively male companionship was still worse: especially when that all-female Russian satellite station generally called the Nunnery passed within view.

"In short," Erik Bull told his friends, "if I want to take vows of poverty, chastity, and obedience, I'd do better to sign up as a Benedictine monk. I'd at least have something drinkable on hand."

Not that he regretted the time spent, once it was safely behind him. With judicious embroidering, he had a lifetime supply of dinner-table reminiscences. More important, he could take his pick of Earthside jobs. Such as the marine reclamation station his countrymen were building off Svalbard, with regular airbus service to Trondheim and Oslo. *There* was a post!

Instead of which, he was now spinning off beyond Mars, hell for leather into a volume of space that had already swallowed a score of craft without trace.

He emerged on the hull, made sure his life line was fast, and floated a few minutes to let his eyes adjust. A tiny heatless sun, too brilliant to look close to, spotted puddles of undiffused glare among coalsack shad-

ows. The stars, unwinking, needle bright, were so many that they swamped the old familiar constellations in their sheer number. He identified several points as asteroids, some twinkling as rotation exposed their irregular surfaces, some so close that their relative motion was visible. His senses did not react to the radiation, which the ship's magnetic field was supposed to ward off from the interior but which sharply limited his stay outside. Bull imagined all those particles zipping through him, each drilling a neat submicroscopic hole, and wished he hadn't.

The much-touted majestic silence of space wasn't evident either. His air pump made too much noise. Also, the suit stank.

Presently he could make sense out of the view. The ship was a long cylinder, lumpy where meteor bumpers protected the most vital spots. A Norwegian flag, painted near the bows, was faded by solar utraviolet, eroded by micrometeoric impacts. The vessel was old, though basically sound. The Russians had given it to Norway for a museum piece, as a propaganda gesture. But then the Americans had hastily given Norway the parts needed to renovate. Bull himself had spent six dreary months helping do that job. He hadn't been too unhappy about it, though. He liked idea of his country joining in the exploitation of space. Also, he was Americanized enough to feel a certain malicious pleasure when the *Ivan Pavlov* was rechristened in honor of St. Olav.

However, he had not expected to serve aboard the thing!

"O.K., O.K.," he sneered in English, "hold still, Holy Ole, and we'll have a look at your latest disease."

He drew himself back along the line and waddled forward over the hull in stickum boots. Something on the radio transceiver boom . . . what the devil? He bent over. The motion pulled his boots loose. He upended and went drifting off toward Andromeda. Cursing in a lackluster voice, he came back hand over hand. But as he examined the roughened surface he forgot even to be annoyed.

He tried unsuccessfully to pinch himself.

An hour convinced him. He made his laborious way below again. Captain Langnes, who was Navy insisted that you went "below" when you entered the ship, even in free fall. When his spacesuit was off, with only one frost burn suffered from touching the metal, he faced the others across a cluttered main cabin.

"Well?" barked Helledahl. "What is it?"

"As the lady said when she saw an elephant eating cabbages with what she thought was his tail," Bull answered slowly, "if I told you, you wouldn't believe me."

"Of course I would!" said Langnes. "Out with it!"

"Well, skipper . . . we have barnacles."

A certain amount of chemical and biological apparatus had been brought along to study possible effects of the whatever-it-was that

seemed to forbid spacecraft crossing the Asteroid Belt. The equipment was most inadequate, and between them the four men had only an elementary knowledge of its use. But then, all equipment was inadequate in zero gravity, and all knowledge was elementary out here.

Work progressed with maddening slowness. And meanwhile the *Hellik Olav* fell outward and outward, on an orbit which would not bend back again until it was three Astronomical Units from the sun. And the ship was out of communication. And the radar, still functional but losing efficiency all the time, registered an ever thicker concentration of meteorites. And the 'tween-decks radiation count mounted, slowly but persistently.

"I vote we go home," said Helledahl. Sweat glistened on his forehead, where he sat in his tiny bunk cubicle without touching the mattress.

"Second the motion," said Bull at once. "Any further discussion? I move the vote. All in favor, say, *'Ja.'* All opposed, shut up."

"This is no time for jokes, Herr Bull," said Captain Langnes.

"I quite agree, sir. And this trip is more than a joke, it's a farce. Let's turn back!"

"Because of an encrustation on the hull?"

Surprisingly, gentle Torvald Winge supported the skipper with almost as sharp a tone. "Nothing serious has yet happened," he said. "We have now shielded the drive tubes so that the barnacle growth can't advance to them. As for our communications apparatus, we have spare parts in ample supply and can easily repair it once we're out of this fantastic zone. Barnacles can be scraped off the radar arms, as well as the vision parts. What kind of cowards will our people take us for, if we give up at the first little difficulty?"

"Live ones," said Helledahl.

"You see," Bull added, "we're not in such bad shape now, but what'll happen if this continues? Just extrapolate the radiation. I did. We'll be dead men on the return orbit."

"You assume the count will rise to a dangerous level," said Winge. "I doubt that. Time enough to turn back, if it seems we have no other hope. But what you don't appreciate, Erik, is the very real, unextrapolated danger of such a course."

"Also, we seem to be on the track of an answer to the mystery—the whole purpose of this expedition," said Langnes. "Given a little more data, we should find out what happened to all the previous ships."

"Including the Chinese?" asked Bull.

Silence descended. They sat in midair, reviewing a situation which familiarity did nothing to beautify.

Observations from the Martian moons had indicated the Asteroid Belt was much fuller than astronomers had believed. Of course, it was still a rather hard vacuum . . . but one through which sand, gravel, and boulders went flying with indecent

speed and frequency. Unmanned craft were sent in by several nations. Their telemetering instruments confirmed the great density of cosmic debris, which increased as they swung further in toward the central zone. But then they quit sending. They were never heard from again. Manned ships stationed near the computed orbits of the robot vessels, where these emerged from the danger area, detected objects with radar, panted to match velocities, and saw nothing but common or garden variety meteorites.

Finally the Chinese People's Republic sent three craft with volunteer crews, toward the Belt. One ship went off course and landed in the Pacific Ocean near San Francisco. After its personnel explained the unique methods by which they had been persuaded to volunteer, they were allowed to stay. The scientists got good technical jobs, the captain started a restaurant, and the political commissar went on the lecture circuit.

But the other two ships continued as per instructions. Their transmission stopped at about the same distance as the robot radios had, and they were never seen again either.

After that, the big nations decided there was no need for haste in such expensive undertakings. But Norway had just outfitted her own spaceship, and all true Norwegians are crazy. The *Hellik Olav* went out.

Winge stirred. "I believe I can tell you what happened to the Chinese," he said.

"Sure," said Bull. "They stayed on orbit till it was too late. Then the radiation got them."

"No. They saw themselves in our own situation, panicked, and started back."

"So?"

"The meteorites got them."

"Excuse me," said Langnes, obviously meaning it the other way around. "You know better than that, Professor Winge. The hazard isn't that great. Even at the highest possible density of material, the probability of impact with anything of considerable mass is so low—"

"I am not talking about that, captain," said the astronomer. "Let me repeat the facts *ab initio,* to keep everything systematic, even if you know most of them already.

"Modern opinion holds that the asteroids, and probably most meteorites throughout the Solar System, really are the remnants of a disintegrated world. I am inclined to suspect that a sudden phase change in its core caused the initial explosion—this can happen at a certain planetary mass—and then Jupiter's attraction gradually broke up the larger pieces. Prior to close-range study, it was never believed the asteroidean planet could have been large enough for this to happen. But today we know it must have been roughly as big as Earth. The total mass was not detectable at a distance, prior to space flight, because so much of it consists of small dark particles. These, I believe, were formed when the larger chunks broke up into lesser ones which abraded

and shattered each other in collisions, before gravitational forces spread them too widely apart."

"What has this to do with the mess we're in?" asked Bull.

Winge looked startled. "Why . . . that is—" He blushed. "Nothing, I suppose." To cover his embarrassment, he began talking rapidly, repeating the obvious at even greater length:

"We accelerated from Earth, and a long way beyond, thus throwing ourselves into an eccentric path with a semimajor axis of two Astronomical Units. But this is still an ellipse, and as we entered the danger zone, our velocity gained more and more of a component parallel to the planetary orbits. At our aphelion, which will be in the very heart of the Asteroid Belt, we will be moving substantially with the average meteorite. Relative velocity will be very small, or zero. Hence collisions will be rare, and mild when they do occur. Then we'll be pulled back sunward. By the time we start accelerating under power toward Earth, we will again be traveling at a large angle to the natural orbits. But by that time, also, we will be back out of the danger zone.

"Suppose, however, we decided to turn back at this instant. We would first have to decelerate, spending fuel to kill an outward velocity which the sun would otherwise have killed for us. Then we must accelerate inward. We can just barely afford the fuel. There will be little left for maneuvers. *And* . . . we'll be cutting almost perpendicularly across the asteroidal orbits. Their full density and velocity will be directed almost broadside to us.

"Oh, we still needn't worry about being struck by a large object. The probability of that is quite low. But what we will get is the fifteen kilometer-per-second sandblast of the uncountable small particles. I have been computing the results of my investigations so far, and arrive at a figure for the density of this cosmic sand which is, well, simply appalling. Far more than was hitherto suspected. I don't believe our hull can stand such a prolonged scouring, meteor bumpers or no."

"Are you certain?" gulped Helledahl.

"Of course not," said Winge testily. "What is certain, out here? I believe it highly probable, though. And the fact that the Chinese never came back would seem to lend credence to my hypothesis."

The barnacles had advanced astoundingly since Bull last looked at them. Soon the entire ship would be covered, except for a few crucial places toilfully kept clean.

He braced his armored self against the reactive push of his cutting torch. It was about the only way to get a full-grown barnacle loose. The things melded themselves with the hull. The flame drowned the sardonic stars in his vision but illuminated the growths.

They looked quite a bit like the Terrestrial marine sort. Each humped

up in a hard conoidal shell of blackish-brown material. Beneath them was a layer of excreted metal, chiefly ferrous, plated onto the aluminum hull.

I'd hate to try landing through an atmosphere, thought Bull. Of course, that wouldn't be necessary. We could go into orbit around Earth and call for someone to lay alongside and take us off . . . But heading back sunward, we'll have one sweet time controlling internal temperature . . . No, I can simply slap some shiny paint on. That should do the trick. I'd have to paint anyway, to maintain constant radiation characteristics when micrometeorites are forever scratching our metal. Another chore. Space flight is nothing but one long round of chores. The next poet who recites in my presence an ode to man's conquest of the universe can take that universe—every galaxy and every supernova through every last, long light-year—and put . . .

If we get home alive.

He tossed the barnacle into a metal canister for later study. It was still red hot, and doubtless the marvelously intricate organism within the shell had suffered damage. But the details of the lithophagic metabolism could be left for professional biologists to figure out. All they wanted aboard Holy Ole was enough knowledge to base a decision on.

Before taking more specimens, Bull made a circuit of the hull. There were many hummocks on it, barnacles growing upon barnacles. The foresection had turned into a hill of shells, under which the radio transceiver boom lay buried. Another could be built when required for Earth approach. The trouble was, with the interior radiation still mounting—while a hasty retreat seemed impossible—Bull had started to doubt he ever would see Earth again.

He scrubbed down the radar, then paused to examine the spot where he had initially cut off a few dozen samples. New ones were already burgeoning on the ferroplate left by their predecessors—little fellows with delicate glasslike shells which would soon grow and thicken, becoming incredibly tough. Whatever that silicate material was, study of it should repay Terrestrial industry. Another bonanza from the Asteroid Belt, the modern Mother Lode.

"Ha!" said Bull.

It had sounded very convincing. The proper way to exploit space was not to mine the planets, where you must grub deep in the crust to find a few stingy ore pockets, then spend fabulous amounts of energy hauling your gains home. No, the asteroids had all the minerals man would ever need, in developing his extraterrestrial colonies and on Earth herself. Freely available minerals, especially on the metallic asteroids from the core of the ancient planet. Just land and help yourself. No elaborate apparatus needed to protect you from your environment. Just the spaceship and space armor you had to have anyway. No gravitational well to back down into and climb back out of. Just a simple thrust of minimum power.

Given free access to the asteroids, even a small nation like Norway could operate in space, with all the resulting benefits to her economy, politics, and prestige. And there was the *Hellik Olav,* newly outfitted, with plenty of volunteers—genuine ones—for an exploratory mission and to hell with the danger.

"Ha!" repeated Bull.

He had been quite in favor of the expedition, provided somebody else went. But he was offered a berth and made the mistake of telling his girl.

"Ohhhh, Erik!" she exclaimed, enormous-eyed.

After six months in space helping to rig and test the ship, Bull could have fallen in love with the Sea Hag. However, this had not been necessary. When he had returned to Earth, swearing a mighty oath never to set foot above the stratosphere again, he met Marta. She was small and blond and deliciously shaped. She adored him right back. The only flaw he could find in her was a set of romantic notions about the starry universe and the noble Norwegian destiny therein.

"Oh, oh," he said, recognizing the symptoms. In haste: "Don't get ideas, now. I told you I'm a marine reclamation man, from here on forever."

"But this, darling! This chance! To be one of the conquerors! To make your name immortal!"

"The trouble is, I'm still mortal myself."

"The service you can do—to our country!"

"Uh, apart from everything else, do you realize that, uh, even allowing for acceleration under power for part of the distance, I'd be gone for more than two years?"

"I'll wait for you."

"But—"

"Are you *afraid,* Erik?"

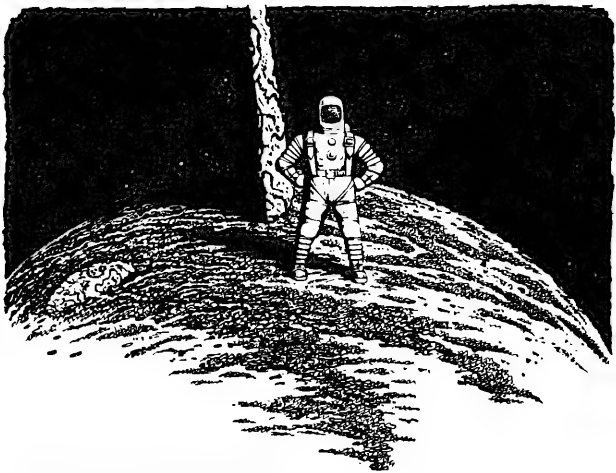
"Well, no. But—"

"Think of the Vikings! Think of Fridtjof Nansen! Think of Roald Amundsen!"

Bull dutifully thought of all these gentlemen. "What about them?" he asked.

But it was a light summer night, and Marta couldn't imagine any true Norwegian refusing such a chance for deathless glory, and one thing sort of led to another. Before he recovered his wits, Bull had accepted the job.

There followed a good deal of work up in orbit, readying the ship, and a shakedown cruise lasting some weeks. When he finally got pre-departure leave, Bull broke every known traffic law and a few yet to be invented, on the way to Marta's home. She informed him tearfully that she was so sorry and she hoped they would always be good friends, but she had been seeing so little of him and had met someone else but she would always follow his future career with the greatest interest. The someone else turned out to be a bespectacled writer who had just completed a three-volume novel about King Harald Hardcounsel (1015-1066). Bull



didn't remember the rest of his furlough very clearly.

A shock jarred through him. He bounced from the hull, jerked to a halt at the end of his life line, and waited for the dizziness to subside. The stars leered.

"Hallo! Hallo, Erik! Are you all right?"

Bull shook his head to clear it. Helledahl's voice, phoned across the lifeline, was tinny in his earphones. "I think so. What happened?"

"A small meteorite hit us, I suppose. It must have had an abnormal orbit to strike so hard. We can't see any damage from inside, though. Will you check the outer hull?"

Bull nodded, though there was no point in doing so. After he hauled himself back, he needed a while to find the spot of impact. The pebble had collided near the waist of the ship, vaporizing silicate shell material to form a neat little crater in a barnacle hummock. It hadn't quite penetrated to the ferroplate. A fragment remained, trapped between the rough lumps.

Bull shivered. Without that overgrowth, the hull would have been pierced. Not that that mattered greatly in itself. There was enough patching aboard to repair several hundred such holes. But the violence of impact was an object lesson. Torvald Winge was almost certainly right. Trying to cut straight across the Asteroid Belt would be as long a

chance as men had ever taken. The incessant bombardment of particles, mostly far smaller than this but all possessing a similar speed, would wear down the entire hull. When it was thin enough to rip apart under stress, no meteor bumpers or patches would avail.

His eyes sought the blue-green glint of Earth, but couldn't find it among so many stars. You know, he told himself, I don't even mind the prospect of dying out here as much as I do the dreariness of it. If we turned around now, and somehow survived, I'd be home by Christmas. I'd only have wasted one extra year in space, instead of more than three—counting in the preparations for this arduous cruise. I'd find me a girl, no, a dozen girls. And a hundred bottles. I'd make up for that year in style, before settling down to do work I really enjoy.

But we aren't likely to survive, if we turn around now.

But how likely is our survival if we keep going—with the radiation shield failing us? And an extra two years on Holy Ole? I'd go nuts!

Judas priest! Was ever a man in such an ugh situation?

Langnes peered at the sheaf of papers in his hand. "I have drafted a report of our findings with regard to the, ah, space barnacles," he said. "I would like you gentlemen to criticize it as I read aloud. We have now accounted for the vanishing of the previous ships—"

Helledahl mopped his brow. Tiny beads of sweat broke loose and glittered in the air. "That doesn't do much good if we also vanish," he pointed out.

"Quite," Langnes looked irritated. "Believe me, I am more than willing to turn home at once. But that is impracticable, as Professor Winge has shown and the unfortunate Chinese example has confirmed."

"I say it's just as impracticable to follow the original orbit," declared Bull.

"I understand you don't like it here," said Winge, "but really, courting an almost certain death in order to escape two more years of boredom seems a trifle extreme."

"The boredom will be all the worse, now that we don't have anything to work toward," said Bull.

The captain's monocle glared at him. "Ahem!" said Langnes. "If you gentlemen are quite through, may I have the floor?"

"Sure," said Bull. "Or the wall or the ceiling, if you prefer. Makes no difference here."

"I'll skip the preamble of the report and start with our conclusions. Winge believes the barnacles originated as a possibly mutant life form on the ancient planet before it was destroyed. The slower breakup of the resulting superasteroidal masses gave this life time to adapt to spatial conditions. The organism itself is not truly protoplasmic. Instead of water, which would either boil or freeze in vacuo at this distance from the sun, the essential liquid is some heavy substance we have not been able to

identify except as an aromatic compound.' "

"Aromatic is too polite," said Bull, wrinkling his nose. The air purifiers had still not gotten all the chemical stench out.

Langnes proceeded unrelenting: " 'The basic chemistry does remain that of carbon, of proteins, albeit with an extensive use of complex silicon compounds. We theorize the life cycle as follows. The adult form ejects spores which drift freely through space. Doubtless most are lost, but such wastefulness is characteristic of nature on Earth, too. When a spore does chance on a meteorite or an asteroid it can use, it develops rapidly. It requires silicon and carbon, plus traces of other elements; hence it must normally flourish only on stony meteorites, which are, however, the most abundant sort. Since the barnacle's powerful, pseudo-enzymatic digestive processes —deriving their ultimate energy from sunlight—also extract metals where these exist, it must eliminate same, which it does by laying down a plating, molecule by molecule, under its shell. Research into the details of this process should interest both biologists and metallurgists.

" 'The shell serves a double function. To some extent, it protects against ionizing radiation of solar or cosmic origin. Also, being a nonconductor, it can hold a biologically generated static charge, which will cause nearby dust to drift down upon it. Though this is a slow method of getting the extra nourishment, the barnacle is exceedingly long-lived, and can adjust its own metabolic and reproductive rates to the exigencies of the situation. Since the charge is not very great, and he himself is encased in metal, a spaceman notices no direct consequences.

" 'One may well ask why this life form has never been observed before. First, it is doubtless confined to the Asteroid Belt, the density of matter being too low elsewhere. We have established that it is poisoned by water and free oxygen, so no spores could survive on any planet man has yet visited, even if they did drift there. Second, if a meteorite covered with such barnacles does strike an atmosphere, the surface vaporization as it falls will destroy all evidence. Third, even if barnacle-crusted meteorites have been seen from spaceships, they look superficially like any other stony objects. No one has captured them for closer examination.' "

He paused to drink water from a squeeze bottle. "Hear, hear," murmured Bull, pretending the captain stood behind a lectern.

"That's why the unmanned probe ships never were found," said Helledahl. "They may well have been seen, more or less on their predicted orbits, but they weren't recognized."

Langnes nodded. "Of course. That comes next in the report. Then I go on to say: 'The reason that radio transmission ceased in the first place is equally obvious. Silicon components are built into the boom, as part

of a transistor system. The barnacles ate them.

" 'The observed increase in internal irradiation is due to the plating of heavy metals laid down by the barnacles. First, the static charges and the ferromagnetic atoms interfere with the powerful external magnetic fields which are generated to divert ions from the ship. Second, primary cosmic rays coming through that same plating produce showers of secondary particles.

" 'Some question may be raised as to the explosive growth rate of barnacles on our hull, even after all the silicon available in our external apparatus had been consumed. The answer involves consideration of vectors. The ordinary member of the Asteroid Belt, be it large or small, travels in an orbit roughly parallel to the orbits of all other members. There are close approaches and occasional collisions, but on the whole, the particles are thinly scattered by Terrestrial standards, isolated from each other. Our ship, however, is slanting across those same orbits, thus exposing itself to a veritable rain of bodies, ranging in size from microscopic to sand granular. Even a single spore, coming in contact with our hull, could multiply indefinitely.' "

"That means we're picking up mass all the time," groaned Bull. "Which means we'll accelerate slower and get home even later than I'd feared."

"Do you think we'll get home at all?" fretted Helledahl. "We can expect the interference with our radiation shield, and the accumulation of heavy atoms, to get worse all the time. Nobody will ever be able to cross the Belt!"

"Oh, yes, they will," said Captain Langnes. "Ships must simply be redesigned. The magnetic screens must be differently heterodyned, to compensate. The radio booms must be enclosed in protective material. Or perhaps—"

"I know," said Bull in great weariness. "Perhaps antifouling paint can be developed. Or spaceships can be careened, God help us. Oh, yes. All I care about is how we personally get home. I can't modify our own magnetic generators. I haven't the parts or the tools, even if I knew precisely how. We'll spin on and on, the radiation worse every hour, till—"

"Be quiet!" snapped Langnes.

"The Chinese turned around, and look what happened to them," underlined Winge. "We must try something different, however hopeless it too may look."

Bull braced his heavy shoulders. "See here, Torvald," he growled, "what makes you so sure the Chinese did head back under power?"

"Because they were never seen again. If they had been on the predicted orbit, or even on a completed free-fall ellipse, one of the ships watching for them in the neighborhood of Earth would have— Oh."

"Yes," said Bull through his teeth. "Would have seen them? How do you know they weren't seen? I think they were. I think they plugged blindly on as they'd been ordered to,

and the radiation suddenly started increasing on a steep curve—as you'd expect, when a critical point of fouling up was passed. I think they died, and came back like comets, sealed into spaceships so crusted they looked like ordinary meteorites!"

The silence thundered.

"So we may as well turn back," said Bull at last. "If we don't make it, our death'll be a quicker and cleaner one than those poor devils had."

Again the quietude. Until Captain Langnes shook his head. "No. I'm sorry, gentlemen. But we go on."

"What?" screamed Helledahl.

The captain floated in the air, a ludicrous parody of officerlike erectness. But there was an odd dignity to him all the same.

"I'm sorry," he repeated. "I have a family too, you know. I would turn about if it could be done with reasonable safety. But Professor Winge has shown that that is impossible. We would die anyhow—and our ship would be a ruin, a few bits of worn and crumpled metal, all our results gone. If we proceed, we can prepare specimens and keep records which will be of use to our successors. Us they will find, for we can improvise a conspicuous feature on the hull that the barnacles won't obliterate."

He looked from one to another.

"Shall we do less for our country's honor than the Chinese did for theirs?" he finished.

Well, if you put it that way, thought Bull, yes.

But he couldn't bring himself to say it aloud. Maybe they all thought the same, including Langnes himself, but none was brave enough to admit it. The trouble with us moral cowards, thought Bull, is that we make heroes of ourselves.

I suppose Marta will shed some pretty, nostalgic tears when she gets the news. Ech! It's bad enough to croak out here; but if that bluestocking memorializes me with a newspaper poem about my Viking spirit—

Maybe that's what we should rig up on the hull, so they won't ignore this poor barnacled derelict as just another flying boulder. Make the Holy Ole into a real, old-fashioned, Gokstad type ship. Dragon figurehead, oars, sail . . . shields hung along the side . . . hey, yes! Imagine some smug Russian on an Earth satellite, bragging about how his people were the first into space—and then along comes this Viking ship—

I think I'll even paint the shields. A face on each one, with its tongue out and a thumb to its nose—

Holy hopping Ole!

"Shields!" roared Bull.

"What?" said Langnes through the echoes.

"We're shielded! We can turn back! Right now!"

When the hubbub had died down and a few slide rule calculations had been made, Bull addressed the others.

"It's really quite simple," he said. "All the elements of the answer were there all the time. I'm only surprised that the Chinese never realized

it; but then, I imagine they used all their spare moments for socialist self-criticism.

"Anyhow, we know our ship is a space barnacle's paradise. Even our barnacles have barnacles. Why? Because it picks up so much sand and gravel. Now what worried us about heading straight home was not an occasional meteorite big enough to punch clear through the skin of the ship—we've patching to take care of that—no, we were afraid of a sandblast wearing the entire hull paper thin. But we're protected against precisely that danger! The more such little particles that hit us, the more barnacles we'll have. They can't be eroded away, because they're alive. They renew themselves from the very stuff that strikes them. Like a stone in a river, worn away by the current, while the soft moss is always there.

"We'll get back out of the Belt before the radiation level builds up to anything serious. Then, if we want to, we can chisel off the encrustation. But why bother, really? We'll soon be home."

"No argument there," smiled Langnes.

"I'll go check the engines prior to starting up," said Bull. "Will you and Torvald compute us an Earthward course?"

He started for the doorway, paused, and added slowly: "Uh, I kind of hate to say this, but those barnacles are what will really make the Asteroid Belt available to men."

"What?' said Helledahl.

"Sure," said Bull. "Simple. Naturally, we'll have to devise protection for the radio, and redesign the radiation screen apparatus, as the skipper remarked. But under proper control, the barnacles make a self-repairing shield against sandblast. It shouldn't be necessary to go through the Belt on these tedious elliptical orbits. The space miners can take hyperbolic paths, as fast as they choose, in any direction they please.

"I," he finished with emphasis, "will not be among them."

"Where will you be?" asked Winge.

But Erik Bull was already headed aft to his work. A snatch of song, bawled from powerful lungs, came back to the others. They all knew English, but it took them a moment to get the drift.

"'. . . Who's that knocking at
my door?'
Said the fair young maiden.
'Oh, it's only me, from over the
sea,'
Said Barnacle Bill the sailor.
'I've sailed the seas from shore
to shore,
I'll never sail the seas no more.
Now open up this blank-blank
door!'
Said Barnacle Bill the sailor."

THE END

ALARM CLOCK

By EVERETT B. COLE

Illustrated by Van Dongen

Most useful high explosives, like ammonium nitrate, are enormously violent... once they're triggered. But they will remain seemingly inert when beaten, burned, variously punished—until the particular shock required comes along....

ANY years had passed since the original country rock had been broken, cut and set, to form solid pavement for the courtyard at Opertal Prison. And over those years the stones had suffered change as countless feet, scuffing and pressing against once rough edges, had smoothed the bits of rock, burnishing their surfaces until the light of the setting sun now reflected from them as from polished mosaic.

As Stan Graham crossed the wide expanse from library to cell block, his shoe soles added their small bit to the perfection of the age-old polish.

He looked up at the building ahead of him, noting the coarse, weathered stone of the walls. The severe, vertical lines of the mass reminded him of Kendall Hall, back at the Stellar Guard Academy. He smiled wryly.

There were, he told himself, differences. People rarely left this place against their wishes. None had wanted to come here. Few had any desire to stay. Whereas at the Academy—

How, he wondered, had those other guys they'd booted out really felt? None had complained—or even said much. They'd just packed their gear and picked up their tickets. There had been no expression of frustrated rage to approach his. Maybe there was something wrong with him—some unknown fault that put him out of phase with all others.

He hadn't liked it at all.

His memory went back to his last conversation with Major Michaels. The officer had listened, then shaken his head decisively.

"Look, Graham, a re-examination

wouldn't help. We just can't retain you."

"But I'm sure—"

"No, it won't work. Your academic record isn't outstanding in any area and Gravitics is one of the most important courses we've got."

"But I don't see how I could have bugged it, sir. I got a good grade on the final examination."

"True, but there were several before that. And there were your daily grades." Michaels glanced at the papers on his desk.

"I can't say what went wrong, but I think you missed something, way back at the beginning. After that, things got worse and you ran out of time. This is a pretty competitive place, you know, and we probably drop some pretty capable men, but that's the way it is."

"Sir, I'm certain I know—"

"It isn't enough to know. You've got to know better than a lot of other people."

Michaels got to his feet and came around the desk.

"Look, there's no disgrace in getting an academic tossout from here. You had to be way above average to get here. And very few people can make it for one year, let alone three or four."

He raised a hand as Stan started to speak.

"I know. You think it looks as though you'd broken down somehow. You didn't. From the day you came here, everyone looked for weaknesses. If there'd been a flaw, they'd have found it—and they'd have been on you till you came apart —or the flaw disappeared. We lose people that way." He shrugged.

"You didn't fall apart. They just got to you with some pretty rough theory. You don't have to bow your head to anybody about that."

Stan looked at the heavily barred door before him.

"No," he told himself, "I don't suppose I'm the galaxy's prize boob, but I'm no high value shipment, either. I'm just some guy that not only couldn't make the grade, but couldn't even make it home without getting into trouble."

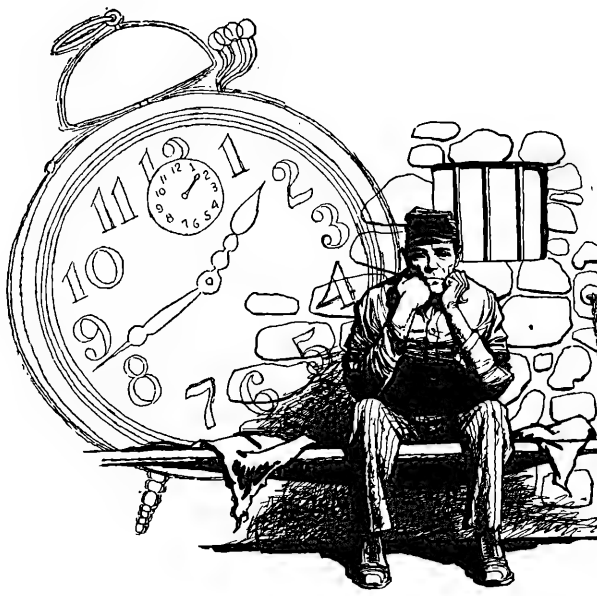
He pushed the door aside and went into the building, pausing for an instant between two monitor pillars. There was no warning buzz and he continued on his way through a hallway.

He barely noticed his surroundings. Once, when he had first been brought here, he had studied the stone walls, the tiny, grilled windows, the barred doors, with fascinated horror. But the feeling had dulled. They were just depressingly familiar surroundings now.

He stopped at a heavy metal grill and handed a slip through the bars. A bored guard turned, dropped the paper into a slot, then glanced at a viewplate. He nodded.

"All right, forty-two ninety. You're on time. Back to your cell." He punched a button and a gate slid aside.

Stan glanced at the cell fronts as he walked. Men were going about



their affairs. A few glanced at him as he passed, then looked away. Stan closed his eyes for an instant.

That much hadn't changed. At school, he had never been one with any of the cadet groups. He had been accepted at first, then coolly tolerated, then shunted to the outer edges.

Oh, he'd had his friends, of course. There were those other oddballs, like Winton and Morgan. But they'd gone. For one reason or another, most of them had packed up and left long before he'd had his final run-in with the academic board.

And there had been Major Michaels. For a while, the officer had been warm—friendly. Stan could remember pleasant chats—peaceful hours spent in the major's comfortable quarters. And he could remember parties, with some pretty swell people around.

Then the older man had become a forbidding stranger. Stan had never been able to think of a reason

for that. Maybe it was because of the decline in his academic work. Maybe he'd done something to offend. Maybe—

He shook the thoughts away, walked to a cell door, and stood waiting till the guard touched the release button.

As Stan tossed his books on his bunk, Jak Holme raised his head and looked across the cell.

"More of them books?"

"Yeah." Stan nodded. "Still trying to find out about this planet."

"You trying to be some kinda big politician when you get out?" Holme snorted.

"Tell you, be better you try mixing with the guys, 'stead of pushing 'em around with that fancy talk, making 'em jump now and then, see. You get along with 'em, you'll see. They'll tell you all you need. Be working with some of 'em, too, remember?"

"Oh, I don't try to push anybody around." Stan perched on his bunk. "Doesn't hurt anyone to study, though."

"Oh, sure." Holme grimaced. "Do you a lot of good, too. Guy's working on some production run, it helps a lot he knows why all them big guys in the history books did them things, huh?" He laughed derisively.

"Sure it does! What they want, you should make that fabricator spit out nice parts, see?" He swelled his chest.

"Now me, I got my mind on my business, see. I get out of here, I oughta make out pretty good." He looked around the cell.

"Didn't get no parole, see, so I get all the training. Real good trained machinist now, and I'm gonna walk out of here clean. Get a job down at the spaceyards.

"Machinist helper, see? Then, soon's I been there a while, I'll get my papers and go contract machinist. Real good money. Maybe you'd do better, you try that."

From the lower bunk, Big Carl Marlo laughed softly.

"Sure, kid, sure. You got it all made, huh? Pretty quick, you own Janzel Equipment, huh? Hah! Know what happens, you go outside?

"Sure, they give you a job. Like you said, helper. They pay enough you get a pad and slop to keep you alive. That's all you get."

"Aw, now listen!" Holme started up.

Marlo wagged his head. "You go for papers, see? Naw! Got no papers for jailbirds. Staffman'll give you the word. He gets through pushing you around, you go back, 'counta you don't know nothing else."

He laughed shortly.

"Gopher, that's you. You go fer this, and you go fer that. Slop and a pad you get." He swung out of his bunk.

"Oh, sure, maybe they put you on a fabricator. Even let you set it up for 'em. But that don't get you no extra pins."

Holme shook his head.

"Councilor gave me the word," he said stubbornly. "They need good machinists."

"Yeah." Marlo nodded. "Sure, they want graduates down at Talburg. But they ain't paying 'em for no contract machinist when they can keep 'em as helpers." He turned.

"Ain't that right, Pete?"

Karzer looked up from a bag he was packing.

"Yeah, yeah, that's right, Carl. I know a few guys once, tried playing the legit. Got kicked around, see? Low pay. Staffman hammering on 'em all the time. Big joke when they try to get more for themselves.

"Yeah, big joke. They get blamed, they bust something, see, so they owe the company big money." He looked critically at a pair of socks.

"So they get smart after a while. Dusted around the corner and went back on the make. Do better that way, see?

"Naw, they give you a lot of guff, you go to work outside, work hard, keep your nose clean, you come out of parole and you're in the money. It's sucker bait, is all. Don't go like that, see."

Marlo came closer to Holme.

"Naw, you go out clean, see, just like you say. Then you play it easy. Get a good score and lay back for a while. Don't go pushing your luck.

"That's how they hook me, see. I get too hungry. Get a nice touch, it looks so good I gotta go back for seconds, and they're waiting. I don't make that mistake again." He shook his head.

"Got me a nice pad, way up valley. Gonna hole up there. Go out, pull a good job, then I lay around, maybe a year and think up another. Then, when I'm all ready, I go out, pull a can or two open and lift what they got back to the pad. Ain't gonna be no more of this scuffling around, hitting a quick one and running out to spend the pins quick, so's I can get in no traps."

He looked at Holme thoughtfully.

"I just now think of something, kid. You can make yourself a nice bit, real easy. Don't cost hardly nothing to set up and there ain't much risk. You work more'n a year, learning all about tools, huh? They teach you all about making tools, huh?"

"Sure." Holme laughed shortly. "Got to make all your own hand tools before you get through. Why?"

Marlo grinned broadly.

"I could tell you a lotta guys, need real special tools. Need tools you don't buy in no store, like maybe a good can opener a guy can carry easy. And they pay real good, you make what they want and keep your mouth shut." He rubbed his chin.

"Nice," he went on. "Real nice. And all you need is maybe a few tools you can buy anywhere. And maybe you gotta build up a little forge. Guy knew his way around, he could make a nice pile that way."

Stan looked at the man thoughtfully.

"Sounds interesting," he broke in, "but suppose they find some fabri-

cator operator out in the woods, heating up metal instead of working on a regular job? They'd be curious, don't you think? Especially if the guy's already picked up a record."

"Naw." Marlo turned toward him. "So he's a graduate—who ain't? See, they show this guy up here, he's supposed to be a fabmeister. Only maybe he don't like punching keys. Maybe he don't like to chase them meters, huh? So maybe he'd rather use muscle hardware, see?" He grinned.

"Some guy sets himself up a shack up valley, see? Starts a fixit joint. Looks real legit. Even with muscle hardware, he can put out jobs faster'n them people can get parts from way down Talburg way, see.

"And he gets in with the joes, too. They got their troubles getting things made up for 'em. So this guy gives them a hand. Even working cheap, he picks up some change there, too, and one way or another, the guy's got a living, see?" He glanced back at Holme.

"Only now and then, here comes a few guys in the back door, they want a special job, see, for real special pay. And there's your ice cream and cake. And maybe a little stack for later on."

"I don't know." Stan picked up a book. "I'd rather try playing 'em on the table for a while. It might beat getting flashed and dropped back in."

Big Carl shrugged and crawled back into his bunk.

"Aagh, can happen to anybody," he said. "Just keep this under your hair. Smart kids like you can make out pretty good, you just use your heads. Ain't nothing down Talburg way, though." He yawned.

"Well, I've had it. Got into it with that Wanzor again, out on the pile. Give one of them joes a boost, he gets three meters high." He yawned again and turned toward the wall.

Stan flipped the pages of the book. He had still been unable to put his finger on the point at which Kellonia had ceased to be a planet of free citizens and become the planetary prison he had found himself on.

There had been no sudden change —no dramatic incident, such as the high spots in the history of his native Khloris. Here, things had just drifted from freedom to servitude, with the people dropping their rights as a man discards outworn clothing.

He leaned back, lowering the book. Kell's planet, he remembered, had been one of the first star colonies to be founded after the discovery of the interstellar drive. Settlers had flocked to get passage to the new, fertile world.

During the first three hundred years, people had spread over the planet, but the frontier stage had passed and the land of promise had stabilized, adopted laws, embraced the arts and sciences. One by one, frontier farms had given way to mechanized food-producing land,

worked by trained technical teams and administered by professional management.

Kellonia had entered the age of industrialized culture, with the large individual owner a disappearing species.

Unnoticed and unregretted, the easy freedom of the frontier was discarded and lost. One by one, the rights enjoyed by the original settlers became regarded as privileges. One by one, the privileges were restricted, limited by license, eliminated as unsuitable or even dangerous to the new Kellonian culture.

Little by little, the large group became the individual of law and culture, with the single person becoming a mere cipher.

Members of groups—even members of the governing council itself—found themselves unable to make any but the most minor decisions. Precedent dictated each move. And precedent developed into iron-hard tradition.

In fact, Stan thought, the culture seemed now to be completely self-controlled—self-sustaining. The people were mere cells, who conformed—or were eliminated.

Again, he picked up the book, looking casually through its pages. Detail was unimportant here. There was, he realized with a feeling of frustration, only a sort of dull pattern, with no significant detail apparent.

He awoke a little groggily, looked around the cell, then jumped hastily out of his bunk. Usually he was awake before the bell rang.

Pete Karzer was coming back from the washstand. He looked over.

"You up, Graham?" he said in his whispery voice. "Hey, you know I'm getting out this morning. Guess you'll want to swap blankets again, huh?"

"That's right, too. No use turning in a good blanket, is there?"

"Don't make sense." Pete massaged the back of his neck.

"Never could figure that swap," he said. "Don't get me wrong, it was real good, being able to sleep warm, but you caught me good when I tried to swipe that blanket of yours. Ain't never seen a guy move so quick. And I ain't so dumb I don't know when I'm licked." He grinned ruefully.

"So I'm down, like I been hit with a singlejack. Then you go and hand over a good blanket for that beat thing I been using. How come?"

Stan shrugged. "I told you," he said. "Where I come from, it's a lot colder than it is here, so I don't need a blanket. I'd have offered a swap sooner, but I didn't want to look like some greasy doormat."

"Wasn't no grease about that swap." Pete grinned and rubbed his neck again. "I found out real quick who was the big man. Where'd you learn that stuff anyway?"

"Oh, picked it up—here and there." Stan glanced down at the floor.

There would be no point in explaining the intensive close combat

training he'd been put through at school. Such training would make no sense to his cellmates. To the good citizens of Kellonia, it would seem horrifyingly illegal. He glanced up again.

"You know how it is," he went on. "A guy learns as he goes."

Big Carl Marlo swung his legs over the side of his bunk.

"Looks like you learned real good," he said. He examined Stan.

"Pete tells me about this deal. I kinda miss the action this time, but Pete tells me he's got the blanket and he's all set to plug you good, you should maybe try a hassle.

"Only all at once, you're on him. He feels a couple quick ones, then he don't know nothing till next day. You can maybe do things like that any time?"

Stan shrugged. "Guy never knows what he can do till he tries. I know a few other tricks, if that's what you mean."

Marlo nodded. "Yeah. Know something, kid? Ain't no use you waste your time being no fabricator nurse. You got a good profesh already, know what I mean?"

Stan looked at him questioningly.

"Sure." Marlo nodded. "So you come here, like maybe you're a tourist, see. But the joes get you and they bring you up here. Going to teach you a trade—fabricator nurse, see. Only they don't know it but you're one guy they don't have to teach, 'counta you got something better. All you gotta do is find your way around."

"I have? Do you really think . . ."

"Sure. Look, there's a lot of antique big-timers around, see. These old guys figure they need some guy can push the mugs. Pay real good, too, and they couldn't care less you're a graduate. Maybe makes it even better, see. You get in with one of those old guys, you got it made. All legit, too. Oughta look into that, you get out."

Stan smiled. "The first day I was on this planet, they went through my bags while I was out looking over the town. They found a paper knife and a couple of textbooks." He shrugged.

"So I came back to the hotel and someone hit me with a flasher. I came to in a cell." He glanced around.

"Somebody finally told me they'd given me two to five years for carrying a dangerous weapon and subversive literature. Now what would I get if I went out and really messed some guy up?"

Marlo waved a hand carelessly.

"Depends on who you work for," he declared. "You got the right boss, you get a bonus. Worse the guy's gaffed, the bigger the payoff, see?"

Stan reached for his bag of toilet articles.

"That's legitimate?"

"Sure." Marlo smiled expansively. "Happens all the time. Even the big outfits need musclers. Staffmen, see? Sorta keep production up.

"Lot of guys get real big jobs that way. Start out, they're Staff Assist-

ance Specialists, like they roust the mugs when they got to. Then pretty quick, they're all dressed up fancy, running things. Real good deal." He shrugged.

"Need a heavy man once in a while, even in my business. Like maybe some guy's got a good pad, he doesn't want a lot of prowlers shaking up the neighbors. You know, gets the law too close, and a guy can't work so good with a lot of joes hanging around. Might even decide to make a search, then where'd you be?" He spread his hands.

"But there's some Johnny Raw, keeps, coming around. And maybe this is a pretty rough boy, you can't get on him personal, see. So the only answer, you get some good heavy guy to teach this ape some ethics. Lotta staffmen pick up extra pins this way."

"I think I get the idea. But suppose the law gets into this deal?"

Marlo spread his hands. "Well, this is a civil case, see, so long as the chump don't turn in his ticket. So, anything comes up, you put an ambassador on the job. He talks to the determinators and the joes don't worry you none. Just costs a little something, is all."

Pete looked up from his packing, a smile twisting his face.

"Only trouble, some of these big boys fall in love with their work. This can get real troublesome, like I pick up this five to ten this way.

"See, they get this chump a couple too many. So, comes morning, he's still in the street. Real tough swinging a parole, too. I'm in here since five years, remember? So I'm real careful where I get muscle any more."

"Sounds interesting." Stan nodded thoughtfully.

"Great Space and all the little Nebulae," he said to himself. "What kind of a planet is this? Nothing in the histories about this sort of thing." He walked over to the washstand.

"Some day," he promised himself, "I'm going to get out of here. And when I do, I'll set up camp by Guard Headquarters. And I'll needle those big brains till they do something about this."

There was, he remembered, one organization that should be able to do more than a little in a case like this. He smiled to himself ruefully as he thought of the almost legendary stories he had heard about the Federation's Special Corps for Investigation.

As he remembered the stories, though, corpsmen seemed to appear from nowhere when there was serious trouble. No one ever seemed to call them in. No one even knew how to get in touch with them. He shrugged.

The men of the Special Corps, he remembered, were reputed to be something in the superhuman line.

For a large part of his life, he had dreamed of working with them, but he had been unable to find any way of so much as applying for membership in their select group. So, he'd

done the next best thing. He'd gone into the Stellar Guard. And he'd lasted only a little more than three years.

Somehow, he'd taken it from there. He was still a little hazy as to how he'd managed to land in prison on Kell's planet. It had been a mere stopover.

There had been no trial. Obviously, they had searched his luggage at the hotel, but there had been no discussion. He'd simply been beamed into unconsciousness.

After he'd gotten to Opertal, someone had told him the length of his sentence and they'd assigned him to the prison machine shop, to learn a useful trade and the duties of a citizen of Kellonia.

He smiled wryly. They had taught him machinery. And they'd introduced him to their culture. The trade was good. The culture—?

His memory slid back, past the prison—past the years in Kendall Hall, and beyond.

He was ten years old again.

It was a sunny day in a park and Billy Darfield was holding forth.

"Yeah," the boy was saying, "Dad told me about the time he met one of them. They look just like anyone else. Only, when things go wrong, there they are, just all at once. And when they tell you to do something, you've had it." He closed his eyes dreamily.

"Oh, boy," he said happily, "how I'd love to be like that! Wouldn't it be fun to tell old Winant, 'go off some place and drown yourself'?"

Stan smiled incredulously. "Aw, I've heard a lot about the Special Corps, too. They've just got a lot of authority, that's all. They can call in the whole Stellar Guard if they need 'em. Who's going to get wise with somebody that can do that?"

Billy shook his head positively. "Dad told me all about them, and he knows. He saw one of 'em chase a king right off his throne once. Wasn't anybody to help him, either. They've got all they need, all by themselves. Just have to tell people, that's all."

With a jerk, Stan came to the present. He slopped water over his hands.

"Too bad I can't do something like that myself," he thought. "I'd like to tell a few people to go out and drown themselves, right now." He grinned ruefully.

"Only one trouble. I can't. Probably just a lot of rumor, anyway."

But there was something behind those stories of the Special Corps, he was sure. They didn't get official publicity, but there were pages of history that seemed somehow incomplete. There must have been someone around with a lot more than the usual ability to get things done, but whoever he had been, he was never mentioned.

He shrugged and turned away from the washstand.

"Hope that bell rings pretty soon," he told himself. "I'd better

get chow and go to work before I really go nuts."

A demonstrator had the back off from one of the big Lambert-Howell sprayers. As the man started to point out a feed assembly, another prisoner stepped directly in front of Graham.

Stan shook his head impatiently and moved aside. Again, the man was in front of him, blocking his view. Again, Stan moved.

The third time the man blocked his view, Stan touched his shoulder.

"Hey, Chum," he said mildly, "how about holding still a while. The rest of us would sort of like to see, too."

For several seconds, the other froze. Then he whirled, to present a scowling face.

"Who you pushing around, little rat? Keep your greasy paws to yourself, see." He turned again, then took a sudden, heavy step back.

Stan moved his foot aside and the man's heel banged down on the stone floor. For a heartbeat, Stan regarded the fellow consideringly, then he shook his head.

"Stay in orbit, remember?" he told himself. He moved aside, going to the other side of the group around the fabricator.

Now he remembered the man. Val Vernay had been working on the fabricators when Stan had come to the shop.

Somehow, he had never run an acceptable program, but he hung around the demonstrations, unable to comprehend the explanations—re-

sentful of those who showed aptitude.

He glanced aside as Stan moved, then pushed his way across until he was again in front of the smaller man. Stan sighed resignedly.

Again, the heavy foot crashed toward the rear. This time, the temptation was too great. Deftly, Stan swung his toe through a small arc, sweeping Vernay's ankle aside and putting the man off balance.

He moved quickly away, further trapping the ankle and getting clear of the flailing arms.

For a breathless instant, Vernay tried to hop on one foot, his arms windmilling as he fought to regain his balance. Then he crashed to the floor, his head banging violently against the stones.

Stan looked at the body in consternation. He had merely intended to make the fellow look a little silly.

"Hope he's got a hard head," he told himself.

The workroom guard came up warily.

"What's all this?"

"I don't know, sir." Stan managed a vaguely puzzled look. "First thing I knew, he was swinging his arms all over the place. Then he went down. Maybe he had a fit, huh?"

"Yeah." The guard was sardonic. "Yeah, maybe he had a fit. Well, no more trouble out of him for a while." He raised his voice.

"Hey, you over by the first-aid kit. Grab that stretcher."

Big Carl Marlo was in his bunk when Stan came into the cell. He looked up with a grin.

"Hey, kid, you start at the top, huh?"

"What do you mean?"

"This Vernay, what else? Like I said, you start at the top. I didn't think you got it when I told you about the muscle racket. How'd I know you was already figuring something?" Marlo shook his head admiringly.

"Real nice job, too. You take it easy, set this chump up, and there you are. Only you get a real big fish. Think you can handle this guy again?"

Stan blinked. "Look," he said, "punch in some more data, will you? And run it by real slow. I'm way off co-ordinates."

"Huh? What you— Oh, I get you." Marlo frowned.

"Now don't go telling me you don't know about this Vernay. Don't give me you ain't figured how you can land a big job with Janzel Equipment. You know me—Big Carl. I don't talk, remember?" He looked at the blank expression on Stan's face.

"Besides, there ain't a guy in the walls, don't figure this deal by now. Man, you just don't know how many guys been watching that Vernay."

Stan walked across the cell and sat down on his bunk.

"Look," he said patiently, "let's just say I'm some stupid kid from off planet. Maybe I don't get things so well. Now, what's this all about?"

Marlo shrugged. "So all right, but for some guy don't know what he's doing, you sure pick 'em pretty. Well, anyway, here's the layout.

"See, this guy, Vernay, is one of Janzel's big strong-arms. Real salt and butter guy. Been pushing them poor apes of theirs all over the place, see. Don't know too much about the business, but they tell him some mug's not putting out, Vernay goes over and bends the guy around his machine a while, he should maybe work faster. See what I mean?"

Stan frowned distastefully and Marlo held up a hand.

"Oh, that's all right," he said. "This is what they pay this guy for. But he gets to like his work too well, know what I mean? So here a while back, he gets on some machine tender. Leans all over this poor guy. Well, the fab nurse ends up turning in his tickets, and this, the joes don't go for so good." He jerked a shoulder.

"Oh, Janzel tries to kill the squawk, but it's no go. The joes push the button and here's Vernay." He grinned.

"They manage to get it knocked to some kinda manslaughter, but Vernay's still got time to pick up, so they pull wires and get him up here. It ain't no rest home, but it ain't no madhouse neither, like some of them places." His eyes clouded.

"Oogh, when I think of some of the holes—" He waved a hand.

"So anyway, like you see, Vernay's got plenty of muscle, but he's kind of low in the brain department. Maybe they thought something might drill through the skull up here, but that don't work either. I guess Janzel'd about as soon get another pretty boy, but they know they'll lose too much face, they dump him right away.

"Then you come along and just about split the chump's conk just so's he'll stay out of your light, see?" He shook his head slowly.

"Only thing, that don't solve nothing. He comes out of the bonehouse in a couple days, and he ain't gonna like you at all. See what I mean?"

"Yeah." Stan examined his fingernails.

"Yeah," he repeated. "You make it all nice and clear." He got up and went to the washstand.

"Whatcha gonna do, Georgie, boy?" he chanted. "Guess I'll just have to give him a free lesson in breakfalls. He won't like it too well, but he could use lots of practice."

It took Vernay more than a couple of days to get out of the hospital. As time went by, Stan became more and more conscious of the speculative looks he was getting from prisoners and guards alike.

He stood watching, as a maintenance engineer tore into the vitals of a Lambert-Howell. Around him was space—a full meter on all sides. It was, he realized, a distinction—symbolic accolade for anyone who had the temerity to down a man like Vernay. It was also a gesture of caution. No one was anxious to block

the view of a man who had downed a vicious fighter with an unobtrusive gesture. And no one was anxious to be too close when Vernay might come by.

What sort of man was Vernay, Stan wondered. Of course, he was familiar with the appearance of the tall, blond. He could easily visualize the insolent, sleepy looking eyes—the careless weave of the heavy shoulders. And he'd heard a lot about the man's actions.

But these could mean anything. Was the man actually as clumsy and inept as he'd seemed? Was he simply a powerful oaf, who relied on pure strength and savagery? Or was he a cunning fighter, who had made one contemptuously careless mistake?

"Well," the maintenance man was saying, "that's the way you set those upper coils. Remember, each one has its own field angle, and you've got to set 'em down to within a tenth of a degree. Otherwise, you'll never get a sharp focus and your spray'll make a real mess." He swept his glance over the group.

"You use the manual when you set these things up," he added. "Don't go depending on your memory. You can play some pretty dirty tricks on yourself that way." He looked thoughtfully at the array of coils.

"And don't go using any gravito clamps around these things when the back's off. They don't like it. It makes 'em do nasty things." He flipped his wrist up, looking at his watch.

"All right, that's it. Let's go eat." He snapped a cover back in place and swung down from the catwalk.

Stan turned away. No tools to put away tonight, he thought. Didn't need 'em all afternoon. He smiled. And no column to fall into, either. This was the weekly free night.

He walked out of the shop, following a group of prisoners through the archway into the main yard. Another small group followed him, keeping a decent interval behind.

Someone drew a sharp breath.

"Hey, look! Over there."

Stan followed the direction indicated by a dozen abruptly turned heads. Vernay was lounging in the shadow of the archway. He smiled tigerishly and sauntered toward Stan. The group of prisoners melted away, to form a rough semicircle. From somewhere, others were appearing.

"So all right, little rat," Vernay said softly, "you've had a lot of fun these last few days, eh? Big man around the yard, huh? Yeah! Well, it's going to stop." He massaged his right hand with the thumb and fingers of his left, then stretched out his arms, flexing his fingers.

"Real smart little fella," he added. "Knows all kinds of little tricks. Got anything to say before I open you up for inspection?"

Stan faced him, his feet a few inches apart, his knees slightly bent. He folded his arms without interlacing them.

"Look, Vernay," he said. "I'm not looking for any fight, but if you force one, I'll break you all to pieces. I didn't mean to bust your head the first time, but I can do it on purpose if I have to. Why don't we just forget it?"

Vernay looked dazed for an instant, then recovered and laughed derisively.

"You trying to crawl out and still look good? No, no. You made your brags. Now we'll have a little dance." He took a step forward.

"Come on, baby, just stay there. I'm going to unscrew your head."

He came closer, then reached out, his hand open.

Stan looked at the hand incredulously. No one could be that careless. For an instant, he almost spun away from a suspected trap. Then he decided the man was in no position for a counter. A try for a simple hand hold couldn't do a bit of harm.

His right hand darted up, gripping the outstretched hand before him. He jerked down, clamped the hand with his left, then pressed up and took a quick step forward.

With a startled cry of pain. Vernay spun around and bent toward the ground. Stan carried the motion through with a sudden surge that forced the big man's face almost to the stones. Abruptly, Vernay twisted and kicked, trying to tear away. There was a ripping noise and he screamed thinly, then slumped to the pavement.

Stan looked down at him in bewilderment. It had been too easy, he thought. Something had to be wrong. The imprisoned hand twitched and was flaccid. He let it go and stepped back.

For a few seconds, Vernay lay quietly, then he struggled into violent motion. He scrambled to get to his feet, his left hand groping at his belt. Stan caught the glint of polished steel. He stepped quickly around the man, poising himself.

It was no use, he thought. This would have to be decisive. He brought his two hands up to his shoulder, then swung them like an axe, stepping into the swing as Vernay got his feet under him.

The impact of the blow brought Vernay to a standing position. As the man stood swaying, Stan swung his hands again.

Vernay's back arched and for an instant he was rigid. Then he stumbled forward, to pitch against the wall.

Briefly, he was braced upright against the wall, his left hand high on the stones, the scalpel glittering. Then the hand relaxed and the sliver of steel clattered to the paving. Slowly, the man slid down, to melt into a shapeless heap in the gutter.

Stan sighed, then shook his head and wiped an arm across his eyes.

There was a concerted sigh behind him.

"Go ahead, kid," someone muttered. "Give him the boots. Big phony hadda go trying a knife."

Stan turned. "No use," he said wearily. "I just hope he's still alive."

"I don't get it," said someone. "He wants this guy alive?"

Someone else laughed shortly. "Maybe he just likes to make it tough on himself. Hey, look out! The joes."

As the crowd faded into the nowhere from whence most of it had come, a guard approached Stan warily.

"Now, look, Graham," he said cautiously "I gotta throw you in the hole. You know that, huh?"

Stan nodded listlessly.

"Yeah," he said. " I suppose so."

"Look, fellow, it won't be too long. He jumped you, so they'll have you out of there real soon." The guard was apologetic.

"Besides, they'll probably offer you his job at Janzel. Get you clear out of here. Only don't give me a hard time. All you'll get is both of us flashed."

"Yeah, I know." Stan held out an arm. "Come on, let's go."

Stan watched as the chief test engineer waved a hand.

"Two hundred twenty gravs," the man said. "Full swing completed on both axes. That's it. Ease off your tractors."

He looked closely at his panel of meters, then got off his stool and stretched.

"No evidence of strain. Looks as though all components are good." He turned, looking at the test operators.

"Let's get this place cleaned up."

The sense of disorientation set up by the tractors was subsiding. Stan got to his feet and looked at his companion.

Dachmann nodded at him.

"Well," he said slowly, "Golzer can get off the hook now. His run'll be approved. Suppose we get back on the job."

He led the way out of the blockhouse tunnel.

A car was pulling up at the entrance. A heavy, square face looked from a rear window and a large hand beckoned.

"Dachmann, Graham. Over here."

"Oh, oh." Dachmann sighed. "Here's trouble. Wizow doesn't come out here unless he's got something."

The blocky production chief looked coldly at them as they approached the car.

"It'll be a lot better," he growled, 'if you two clear through my office before you start wandering all over the grounds." He looked at Stan.

"Got a problem for you. Maybe we'll get some action out of you on this one." He held out a few sheets of paper.

"Hold up over in the components line." He jabbed at a sheet with a forefinger.

"Take a trip over there and kick it up." He glanced at Dachmann. "Got another one for you."

Stan took the papers, studying them. Then he looked up. There was very little question as to the bottleneck here. Each material shortage traced back to one machine. He frowned.

"Maintenance people checked over that machine yet?" he asked.

Wizow shrugged impassively. "You're a staffman," he said coldly.

"Been on parole to us long enough, you should know what to do, so I'm not going to tell you how. Just get to the trouble and fix it. All I want is production. Leave the smart talk to the technical people." He turned.

"Get in, Dachmann. I've got a headache for you."

Stan examined the tabulated sheets again. The offending machine was in building nine thirty-two. Number forty-one.

He walked over to the parking lot and climbed on the skip-about he had bought on his first pay day. The machine purred into life as he touched a button and he raised the platform a few inches off the ground, then spun about, to glide across the field toward block nine.

Fabricator number forty-one was a multiple. A single programming head actuated eight spinaret assemblies, which could deliver completed module assemblies into carriers in an almost continuous stream. It was idling.

Stan visualized the flow chart of the machine as he approached. Then he paused. The operator was sitting at the programming punch, carefully going over a long streamer of tape. Stan frowned and looked at his watch. By this time, the tapes should be ready and the machine in full operation. But this man was obviously still setting up.

He continued to watch as the operator laboriously compared the tape with a blueprint before him. There was something familiar in the sharp, hungry-looking features. The fellow turned to look closely at the print and Stan nodded.

"Now I remember," he told himself. "Sornal. Wondered what happened to him. Never saw him after the first day up in Opertal."

Sornal came to the end of the tape, then scrabbled about and found the beginning. He commenced rechecking against the print. Stan shook his head in annoyance.

"How many times is he going to have to check that thing?" he asked himself. He walked toward the man.

"Got trouble?"

Sornal looked up, then cringed away from him.

"I'll get it going right away," he whined. "Honest! Just want to make sure everything's right."

"You've already checked your tape. I've been watching you."

Sornal flinched and looked away.

"Yeah, but these things is tricky. You get some of this stuff out of tolerance, it can wreck a whole ship. They got to be right."

"So, why not a sample run-through? Then you can run test on a real piece."

"This is a very complicated device. Can't check those internal tolerance without you put in on proof load. These got to be right the first time."

Stan shook his head wearily.

"Look. Get up. I'll give your tape a run-through, then we'll pull a sample and check it out. Got a helper?"

"Some place around here." Sornal got out of his chair and stood, looking at the floor.

Stan picked up the tape and sat down.

"All right, go find him then. And bring him over here while I run out the sample. We can make with the talk after that."

The tape was perfect, with neither patch nor correction. Stan finally raised his head, growling to himself.

"Guy's competent enough at programming, anyway. Now, what's wrong with him?"

He snapped the power switch from stand-by to on, then waited as the indicators came up. Delicately, he turned a couple of microdrive dials til the needles settled on their red lines. Then he opened the control head, poked the tape in, and punched the starter lever.

The tape clicked steadily through the head. Stan kept his eyes moving about as he checked the meters.

The tape ran out of the head and dropped into the catcher basket and hydraulics squished as a delivery arm set a small block on the sample table. Stan picked it up, turning it over to examine it.

It was a simple, rectangular block of black material, about the size of a cigarette lighter. On five sides were intricate patterns of silvery connector dots. An identifying number covered the sixth. Inside, Stan knew, lay complex circuitry, traced into the insulation. Tiny dots of alloy formed criti-

cal junctions, connected by minute, sprayed-in threads of conductor material. He glanced around.

Sornal watched anxiously. He looked at the little module block as though it were alive and dangerous.

"Here," Stan told him, "stick this in the test jig and run it."

Sornal carefully set the block into an aperture, then reached for a switch. His hand seemed to freeze on the switch for a moment, then he looked back at Stan and snapped it on. Needles rose from their pins, flickered, then steadied.

Sornal appeared to gain a little confidence. He turned a dial, noted the readings on a few meters, then twisted another dial. Finally, he faced around.

"Looks all right," he said reluctantly, "only—"

"Looks all right, period." Stan turned to the helper.

"Get that machine rolling," he ordered. "And keep your eyes on those meters. Let's get this run finished right." He moved his head.

"Come on, friend, I'll buy you a mug of tea."

Sornal backed away.

"You ain't gonna— Look, ain't I seen you some place before? Look, I just—"

"I said I'd buy you a mug of tea. Then, we'll talk, and that's all. I mean it."

"I just got outta— Listen, I can't take it so good any more, see?"

"Don't worry. We aren't going to have any games this morning. Come on, let's go."

When Sornal started talking, the flow of words was almost continuous.

He had come to Kellonia almost four years before, on a standard one-year contract. For over twenty years, he'd moved around, working in spaceyards over the galaxy. He'd worked on short contracts, banking his profits on his home planet. And he'd planned to finally return to his original home on Thorwald, use his considerable savings to buy a small business, and settle down to semi-retirement.

But an offer of highly attractive rates had brought him to Kellonia for one last contract with Janzel.

"They got my papers somewhere around here," he said, "only I can't get 'em back any more." He shook his head wearily and went on.

Everything had gone smoothly for the first half of his contract period. He'd drawn impressively large checks and deposited them. And after thinking it over, he had indicated he would like an extension.

"That was when they nailed me down," he said. "There was just that one bad run, only that was the job that sneaked through the inspection and went bust at Proof."

"Blowup?"

Sornal grinned sourly.

"Blowup, you want to know? Even took out one of the tractor supports. Real mess. Oh, you think they weren't mad about that!"

"You say there was just one bad run? Then everything came out normally again?"

"Yeah. I ran a check, see? Test

sample was perfect. Beautiful. So then the power went off for a while. Crew was working around. Well, they found the trouble and cleared it, just before lunch time. I went ahead and finished my run. It was only ten gyro assemblies—control job.

"I don't know—guess they were out of balance. Maybe the shaft alloys came out wrong. Anyway, I finished the run and went for chow. Came back and set up a new run."

He stared into his cup.

"Along about quitting time, they came after me. Mister, I don't like to think of that! I been beat up a lot since, but them's just little reminders. Those guys really enjoyed their work!"

Sornal shuddered and set his cup down. Finally, he sighed and continued.

He had left the hospital, muttering grim threats of the legal action he would take. And he'd limped over to file a complaint at the Federation Residency.

"I didn't get there. Next thing I knew, I was in some cell." He looked up at Stan.

"Now I know where I see you. You're in that van, going out of some jail."

"Yeah." Stan nodded, looking at his own empty cup.

"Tell me something," he said slowly. "When that maintenance crew was working around your machine, did they have a gravito clamp!"

"Clamp? Yeah . . . yeah, I suppose they might have. Use 'em a lot around here when they've got heavy stuff, and those guys had a lot of stuff to move."

"I see. Wonder if the field head got pointed at your machine?"

"I don't think . . . I dunno, I didn't watch 'em close." Sornal looked sharply at Stan.

"You mean, they mighta—"

"Well, what could cause a temporary misflow?"

"Yeah!" Sornal bobbed his head slowly. "Funy I didn't think of that."

"So anyway, you went up to Opertal?"

"Yeah. Had me for evasion of obligation. Said I owed the company plenty for the damage done by the blowup. Claimed I'd tried to run out.

"They wouldn't let me in the machine shop up there. Had me out hauling stuff for the landscape crew. Then, they paroled me back here. Back to the machines again, only I ain't a contract man any more. Junior machinist. Oh, it's better than helper, I guess, only they don't pay much." Sornal pushed himself away from the table.

"I'm going to be real careful with my work from now on," he said. "They got me for quite a while, but that sentence'll run out one of these days. I'll get me out of parole and pay off that claim, then I'm getting out of here. They aren't hanging another one on me."

"Only one trouble," Stan told him. "You're getting so careful, you're setting yourself up."

"Huh?"

"Yeah. They'll tack you down for malingering if you don't watch it." Stan got to his feet.

"Tell you what you do. Run things just as you did when you were a contract man. Only one thing—if any crew comes around, pull a sample after they leave. And check it. You know how to check for magnetic and gravitic deviations. Do that, then go ahead with your run. Now go back to your machine. I'm going to do a little work."

He strode out of the refreshment room, watched Sornal as he took over the production run, then swung around and walked over to the Personnel office.

"Like to see the package on a man named Sornal," he told the clerk.

The man hesitated. "We aren't supposed to release a whole file. I can look up any specific information for you."

Stan frowned. "Don't argue with me. I want to see this guy's package. Need his complete history. Now get it."

The clerk started to make an objection, then turned and went to the files. He flipped an index, then punched a combination of numbers on his selector. Finally, he came back with a folder.

Stan took it and flopped it open on the counter.

"All right, now just stay here while I go through this. I'll give it back in a few minutes."

He looked through the records, looking closely at one exhibit.

"Wow!" he told himself silently. "Eleven thousand, six hundred ninety-two interstells. Only way he'll ever pay that off is by making a big dent in his savings."

He flipped the paper over, noting the details of the determination of responsibility.

As he examined the payroll data, he nodded. It all balanced out nicely. They'd get several years of production out of the man for bare subsistence.

"Very neat," he told himself.

He closed the folder and handed it back to the clerk.

"All right, that's all I need." He glanced at the clock.

"Guess I'll check out for lunch."

He walked out of the office. This one, he thought, could be broken wide open by a Guard investigation. Sornal would get his freedom, and there might be sizable damages.

"Now it would be nice," Stan muttered, "if I could work out something for myself."

The Guard sergeant was an old-timer—and a methodical man. He listened impassively, then reached under his desk. For a few seconds, his hand was hidden, then he picked up a pen.

"Now, let's get this straight. What did you say your name was?"

"Graham. Stanley Graham. I—"

The sergeant had pulled a form to him. He bent over, writing slowly.

"Graham, Stanley. All right. Now, where do you live?"

One by one, he went through the maze of blanks, insisting on getting

no other information than that called for by the specific space he was working on. Finally, he put down the pen and leaned back.

"All right, now how about this other man you mention?" He pulled another form to him.

Stan was becoming a trifle impatient. He answered the questions on Sornal, managing to furnish information for most of the blank spaces on the sergeant's form.

The man dragged a still different form to him.

"All right, now what's this exact complaint?"

Stan went through Sornal's history, quoting figures and dates from the Personnel files he had read. The sergeant listened noncommittally, stopping him frequently to get repetitions.

At last, he looked up.

"Got any documents to back up this story?"

Stan coughed impatiently.

"No, of course not. I can't pull a file out of Personnel and just carry it up here. It's on file, though. I just got through reading the working file and there's a private file on the guy, too, that would really bust things wide open."

The sergeant smiled sourly.

"Maybe it would. I suppose they'd pull it right out and hand it over, too."

He spun his chair around and fished a book from a shelf behind his desk.

"Here." He put the book on the corner of the desk. "Here is the regulation on this sort of situation."

He pointed out words, one at a time.

It was a long regulation, filled with complex terminology. It forbade seizure of records in any manner not definitely authorized by local statute. The sergeant went through it, getting full value from each word.

At last his finger came away from the page.

"Those are private records, you're talking about. On this planet, the law protects corporate records to the fullest extent. We'd have to have positive evidence that an incriminating document was in existence. We'd have to define its location and content within fairly narrow limits. Then we'd have to go before a local determinator and request authority for an examination of that document."

He slammed the book shut.

"And if we failed to find the document in question, or if it wasn't actually incriminating, the injured corporation could slap us with a juicy damage claim." He looked at Stan coldly.

"If you want, I can get the local statute and let you look that over, too." He paused briefly and non-expectantly.

"On the other hand, we are obligated to protect the interests of galactic citizens." He looked pointedly at the insigne on Stan's pocket, then held out a tablet.

"Here. Suppose you sit down over there at that table and write out the complaint in your own handwriting. I'll pass it along."

Stan looked at the tablet for a moment.

"Oh— Suppose I manage to get copies of the records on this. Do you think you could do anything then?"

"If you can bring in documentary evidence, that'll make a case; we'll take action, of course. That's what we're here for." The sergeant tapped impassively on the tablet.

"Want to make a written statement?"

"Skip it," Stan told him wearily. "I don't want to waste any more time."

As he turned away, he thought he noticed a faint flicker of disappointment on the sergeant's face before the man bent over his desk.

He hardly noticed his surroundings as he walked back into the Personnel building.

At first, there was a dull resentment—a free-floating rage—which failed to find focus, but sought for outlet in any direction.

The trouble was, he thought, in the formal way of doing things. It didn't really matter, he told himself, whether anything really got done or not—so long as an approved routine was followed.

Only the wrong people used direct, effective methods.

The anger remained nondirectional, simply swelling and surging in all directions at once. There were too many targets and it was a torturing pressure, rather than a dynamic force.

He thought of his brief explosion, then grunted in self-ridicule. He'd implied he could just pick up Sornal's record file, bring it in, and throw it before that sergeant. And for just a flash, he'd really thought of it as a simple possibility.

"Maybe," he told himself, "one of those Special Corpsmen could do something like that, but I don't see any of them around, trying it."

He looked around, startled. Somehow, he had passed the gate, identified himself, parked the skip-about, and come inside—all without remembering his actions.

"Well," he asked himself, "what do I do now? Just become some sort of thing?"

He walked into the outer office and a clerk looked up at him.

"Oh, Mr. Graham. The chief wants to see you." She touched a button and a gate opened.

"You know the way."

"Yes. I do. Wonder what he wants."

The woman shook her head and returned to her work.

"He didn't say. Just said to tell you to see him when you came in."

Stan walked through the short corridor, stopping in front of a door. Down in the corner of the pebbled glass, neat, small letters spelled out the name—H. R. Mauson.

He tapped on the glass.

"Come in." The Personnel chief glanced up as the door opened.

"Oh, Stanley. Sit down."

Stan lowered himself to the padded seat, then leaned back. It was

one of those deep armchairs which invite relaxation.

The official touched a button, then leaned forward.

"Tell me, Stanley," he said gently, "what were you doing in the Federation Building a few minutes ago?"

Stan tried to lift a hand in a casual gesture, but it seemed stuck to the chair. He exerted more force, then twisted his body. But his arms and legs refused to move away from the upholstery. Mauson smiled.

"Just a little precaution, Stanley. A gravito unit, you see. It may be unnecessary, but you do have a reputation for a certain—shall we say, competence. Although you have never demonstrated your abilities here, I see no reason for taking foolish chances." His smile faded.

"Now, suppose you tell me all about that visit you made to the Federation Building."

Stan forced himself to relax. Have to be careful, he thought. He forced a grin to his face.

"Lunch," he said casually. "The Interstellar Room has a reputation all over Talburg, you know." He laughed easily.

"Truth is, I got sort of homesick. Got a sudden urge to have a good dish of *delsau*. It's a sort of preserve we really enjoy at home."

"Now, now." Mauson closed his eyes. "Try again. You should be able to do better than that." He tapped at some notes.

"You were assigned to straighten out that man, Sornal, weren't you?"

"Yes. I was, and I did." Stan found he had enough freedom to move his head. "He was just suffering from—"

Mauson coughed dryly. "I have a report on that, too. You fed him some tea, talked for a while, then left him."

Again, he tapped at his notes.

"Then you came here and demanded the man's Personnel file. You read that and went directly to the Federation Building. Now, I'm not a completely stupid man. Don't try to make me believe you just wanted some exotic food."

He poked a switch.

"Wizow, will you step in here, please?"

"Yes, Mauson?" The blocky production chief loomed through a door.

He glanced at Stan.

"Oh. You got him in here, then?"

"Yes. Oh, he came in by himself. But now, he's trying to be a little coy. Suppose you reason with him."

"Pleasure."

Wizow strode forward to stand over the chair. He struck one hand into the palm of the other, twisting his wrist at each blow. For the first time since Stan had known him, he had a faint smile on his face.

"I don't like you, Graham," he said. "I didn't like you the first time I saw you, and you haven't done a thing to change that first impression.

"Thought you had something funny about you, the way you've al-

ways coddled the workmen. Looked as though you were running some sort of popularity contest." Again, he punched his palm.

"And then, there were those suggestions of yours. Smart words—always pushing the wrong people off balance, like other staffmen." The smile became one-sided.

"You know, you haven't made yourself too popular around here. Not with the people that count. I've been getting complaints.

"A good staffman doesn't act the way you do. Good man sees to it the workers work. They don't have to like him—they just get on the job when he's around. Know what'll happen if they slack off.

"And a good staffman leaves the thinking to guys that get paid to do it. He follows established procedure."

He leaned close to Stan, frowning.

"What are you? Some kind of Federation plant?"

Abruptly, his right hand flashed out, to crash against Stan's cheek. A heavy finger trailed across one eye, bringing a sudden spurt of tears. The hand moved back, poised for a more solid blow.

Stan's head bounced back against the chair, then forward again.

And the diffuse fury in him coalesced and burst into novalike flame. It had a single target. It fo-

cused. He glared at the big man.

"Those hands," he snapped. "Get them to your side!

"Now, get over into that corner. Move when I tell you!"

For an instant, Wizow stood immobile. The frown faded, leaving the heavy face empty.

He tried to raise his hand again, then gave a little sob of hopeless rage and moved back, one slow, reluctant step at a time, until he was wedged into a corner of the room.

"That's good," Stan told him. "Now stay there. And keep quiet."

He turned toward Mauson.

"You. Turn off that gravito unit. Then sit still."

He pushed himself out of the chair as the constraining force was removed.

"Now," he growled, "you can kick it in again. Give it a little power, too, while you're at it." He wheeled around.

"All right," he snapped at Wizow, "turn around. Get into that chair."

He watched as the big body was pressed into the cushions. Wizow's face showed strain. Stan went around Mauson's desk.

"I said a little power." He reached down and gave the gravito control an abrupt twist.

Wizow's mouth popped open, agony showing in his eyes. Stan grinned tightly and eased off on the knob.

"I really should spin this thing up to a proof load," he said. "Might be interesting to see what kind of an assembly job they did on you. But we'll just leave you this way. All you've got to do is keep quiet. You're deaf, dumb, and blind, you understand?" He turned on Mauson.

"Now, for you—" His voice trailed off.

The man was sitting like a puppet whose controlling strings had been cut. Stan's blazing fury started to burn down.

These minds, he suddenly realized, had been virtually paralyzed. He didn't need anything to tie them down. All he had to do was point his finger. They'd jump. He shook his head.

"Funny," he told himself. "All you have to do is be a little forceful. Why didn't somebody tell me about this?" He looked calculatingly at Mauson.

"Tell you what we're gonna do," he said rhythmically. "Get your car over here. You know, the shielded job. We don't want anyone snapping at us with flashers." His voice hardened.

"Come on," he ordered, "get on that box. Tell 'em you want that car."

As the car rolled down the street, he leaned forward a little.

"All right, driver," he said peremptorily, "when we get to the Federation Building, swing into the official driveway."

The driver moved his head slightly. Stan sat back, waiting.

He looked at the building fronts as they swept past. When he'd first come here, he'd noticed the clean

beauty of the city. And he's been unable to understand the indefinable warning he'd felt. But now—he'd looked beneath the surface.

The car slowed. A guard was flagging them down at the building entrance. Stan touched a window control.

"Stand aside, Guardsman," he ordered. "We're coming in." He flicked the window control again.

"Keep going, driver," he ordered. "You can let us out inside. Then find a place to park, and wait."

Another guard came toward them as the car rolled to a stop.

"Hey," he protested, "this is—"

Stan looked at him coldly.

"Which way to the Guard commander's office?"

The man pointed. "Elevator over there. Fifth floor. But—"

"I didn't ask for a story. Get our driver into a parking space and keep him there." Stan turned to Mauson.

"All right. Get out."

He shepherded the man into the elevator and out again. In the hall, he glanced around, then walked through a doorway.

A middle-aged guardsman looked at him inquiringly.

"Can I do something for you gentlemen?"

"Yes. We want to see the commander."

The guardsman smiled. "Well, now, perhaps—"

Stan looked at him sternly.

"I've had my quota of runarounds today. I said we want to see the commander. Now, all you have to do is take us to him. Move!"

The smile faded. For an instant, the man seemed about to rebel. Then he turned.

"This way," he said evenly. He led the way through a large room, then tapped at a door on the other side.

"Yes?"

The voice was vaguely familiar to Stan. He frowned, trying to place it.

"Two men to see you, sir. Seems a little urgent."

"Oh? Well, bring them in."

Stan relaxed. This was getting easier, he thought. Now he could get these people to take Mauson before a determinator. His statements would furnish plenty of evidence for a full search of Janzel's Personnel files.

He jerked his head at Mauson.

"Inside."

He waited as the man stepped through the door, then followed.

A slender man was standing behind a wide desk.

"Well," he said calmly. "Welcome home, Graham. Glad you could make it."

"Major Michaels!" Stan forgot everything he had planned to say.

The other smiled. "Let's say Agent Michaels," he corrected. "Special Corpsmen don't have actual Guard rank. Most of us got thrown out of the Academy in the first couple of years."

He glanced at the guardsman,

then flicked a finger out to point at Mauson.

"Take this down and put it away somewhere till we need it, deSilva. Graham and I have some talking to do."

"Yes, sir." The middle-aged man turned toward Stan.

"Congratulations, sir." He jerked a thumb at Mauson.

"Come on, you. March."

Michaels held up a hand as Stan opened his mouth.

"Never mind," he said quietly. "DeSilva is quite capable of handling that one. Take care of three or four more like him if he had to. Pretty good man." He reached for a box on his desk.

"Here," he said. "Light up. Got a few things to talk about."

"But I've got—"

"It can wait. Wall put the whole story on the tape when you were talking to him downstairs. We've been sweating you out."

"You've been sweating me out? I had to practically force my way up here."

"That you did." Michaels took a cigarette from the box, started to put it in his mouth, then pointed it at Stan.

"That's normal procedure. You've heard of the Special Corps for Investigation, I presume?"

"Yes. But—"

"Ever think of being a corpsman yourself?"

"Of course. You know that—we've talked about it. But I never could—"

"That's right." Michaels waved the cigarette. "We don't have recruiting offices. All our people have to force their way in. Tell me, do you know anything about the history of this planet?"

Stan clenched his teeth. Somehow, he had lost the initiative in this interview. He took a deep breath.

"Look," he said decisively, "I—"

"Later." Michaels shook his head. "You are familiar with this culture by now, then?"

"Well . . . yes. I've read some history . . . a little law."

"Good. Saves me a lot of talk. You know, sometimes we run into a situation that can be corrected by a single, deft stroke. Makes things very pleasant. We send in an agent—or two or six. The necessary gets done, and somebody writes up a nice, neat report." He toyed with the cigarette lighter.

"But this thing isn't like that. We've got a long, monotonous job of routine plugging to do. We've got to bust a hard-shelled system without hurting too many of the people within it. And we've been at it for a while. We think we've made some progress, but we've still got a lot of snakes to kill.

"But even bad situations have their good points. At least, this place is a good training ground for probationers."

"Probationers?"

"Right. Probationers who don't even know they're being tested." He smiled.

"People with the qualifications for Senior Agent are hard to get. Most of them are latent—asleep. We can't expect them to walk in—we have to find them. Then we have to wake them up. It can be tricky."

He lit his cigarette, eying Stan thoughtfully.

"I suppose you've heard some of the stories that fly around about the Corps. The truth of the matter is, the Senior Agent isn't any superman. He's just a normal human being with a couple of extra quirks."

He held up a finger.

"First, he's trouble prone. A nasty situation attracts him much as a flame attracts a moth.

"There are a lot of people like that. Most of them are always getting themselves clobbered. The agent usually doesn't."

He held up a second finger.

"Because he has a compensating ability. When he turns on the pressure, people do just as he tells them —most people, that is." He sighed.

"That's the latent ability. Sometimes full control is buried so deeply it takes something like a major catastrophe to wake the guy up to the fact he can use it." He smiled wryly.

"Oh, he pushes people around once in a while—makes 'em uneasy when he's around—makes himself unpopular. But he's got no control. He's got to be awakened."

"Yes, but—"

"Uh-uh. It sounds simple, but it isn't." Michaels shook his head.

"You don't just snap a finger in front of this fellow. You've got to provide him with real trouble. Pile it on him—until he gets so much pressure built up that he snaps himself into action. Makes a place like this useful."

"I begin to see. You mean all this stuff I've been going through was sort of a glorified alarm clock?"

"Yes. You could put it that way. That, and a trial assignment as a junior agent. Still want to be a Special Corpsman?"

Stan looked around the office consideringly, then got to his feet.

"I stood it without knowing what was going on. Even had a little fun once in a while. Maybe I could learn to like it if I knew what I was doing." He shrugged.

"What's next?"

Michaels shoved a stack of papers toward him.

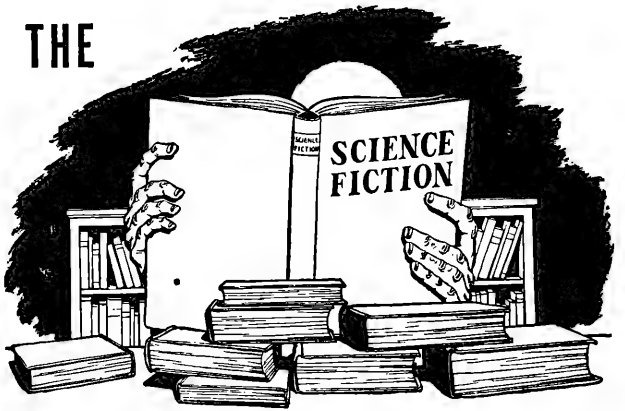
"Administrative details. You just can't get away from them." He took a pen from his desk.

"After you sign all these, I'll get a couple of people in here for witnesses while we give you your oath.

"It's practically painless."

THE END

THE



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By P. SCHUYLER MILLER

OUR LIVELY SATELLITE

SOME significant changes have been taking place in the orthodox astronomical view of our solar system, as new and more sensitive techniques have come into play. Mars is losing ground as an abode of life—although spectroscopic studies seem to show the presence of some kind of complex organic molecules. The desert Venus has been replaced again by a wet Venus. And the Moon has come to life.

The best expression of the new knowledge and new ideas about the Moon is in a volume by an English amateur astronomer, V. A. Firsoff: "Strange World of the Moon" (Basic Books, New York. 1960. 226 pp. $6.00). Judging from the professional reactions that I have seen, this is

an extreme and a partisan book, but not a crackpot or unreasonable one. The author explains his reasoning and gives his sources, and much of what he has to say is the result of piecing together scattered bits of information, in a way that few professionals, absorbed in observing schedules and calculations, have or take time to do.

The Moon we are shown is a companion planet of Earth's, captured, Firsoff suggests, after three widely-spaced approaches whose tidal action triggered the mountain building in Earth's Cambrian, Permo-Carboniferous and Tertiary periods, with even more violent volcanic activity on the Moon. The lunar counterparts of terrestrial SIAL and SIMA—the light acidic rocks of the continental masses, and the darker, densed basic rocks on which they float—must both be lower in density than anything comparable on Earth, he points out. Both, Firsoff feels, must be something like polyurethane foam in structure—parts even water-soluble salts which would be washed away in a good rain, and do wash away when moisture-bearing vapors seep out of the interior.

Firsoff's Moon is not a world without water, but what exists is mostly locked beneath a zone of frozen vapors, a few feet or a few inches below the visible surface. Volcanic activity and tidal unbalance occasionally open clefts into the interior, through which some vapors escape. Deep down there may be caverns like those in which H. G. Wells' Mr. Cavor found the Lunarians—even a sunless sea, and an atmosphere of sorts, not very breathable.

The Moon is also, Firsoff makes clear, a world characterized by a fantastic variety of micro-climates—furiously hot in the direct sunlight in one place, frigidly cold a few feet or a few inches away in the shadow—altered by the physical and chemical nature of the soil, its history, the angle at which it intercepts sunlight, the reflection from other nearby surfaces. It is a world where strange low-pressure transitions between crystalline and vapor states rule, so that there may be bare, glasslike ice in the near-vacuum, but never water.

This is not a counterpart of Lowell's arguments that intelligent canal-builders inhabit Mars. Firsoff's purpose is to show that the known conditions on the Moon, bizarre as they are, do not make a kind of life possible there. I suppose the chemists and physicists who are working out the conditions under which life evolved on Earth, would counter with the objection that these rather critical conditions could never have existed on the Moon. If even the most rudimentary forms of life exist on or in the Moon, they must have arisen from some form of contamination from outside—something like the spores that Svante Arrhenius postulated, light enough to be impelled into space by molecular action in the atmosphere, and carried to other worlds by light pressure, whose effect on the artificial satellites is already being measured.

I had hoped to match with Firsoff's

book an American edition of the Russian booklet presenting and discussing the first photographs of the hidden side of the Moon. This has been promised by Pergamon Press, which advertised it some months ago as if it were out, but my order hasn't been filled as this goes into the mail. As you know, one American reporter, Lloyd Mallan, has charged in an article for *Popular Photography* that the Russian satellite photos are fakes, and I hoped that the book might cast some light on his specific claims. I think he has demonstrated that the photos were pretty heavily and clumsily retouched—perhaps by one of the Soviet news or propaganda agencies, since I am sure the Russian scientists would know the scientific worthlessness of retouched photos. I don't think he has proved anything more—especially since the publication of our own Tiros weather photos, which show the same vagueness, excessive contrast, and paper-like scanning pattern that Mallan complains of in the Russian Moon photographs.

It is interesting that one of the lunar markings that Mallan considers improbable—parallel light streaks that show in some lights against the dark spot of the Mare Undarum—can also be seen in one of the photographs from Lick Observatory that illustrate Firsoff's book, in a United States Navy photo printed with Mallan's own article, and—even more clearly—on the jacket of Plenum Press' United States edition of the first two volumes of Russian scientific papers on the measurements made by Sputniks 1, 2 and 3. The two are reprinted in one 227-page book as "Artificial Earth Satellites," edited by L. V. Kurnosova. They are purely technical papers presented at the 1958 IGY meetings in Moscow, and cost $9.50 in this edition, without index and with only a few illustrations other than graphs of scientific data. The closest thing to a general paper is one describing the training of the space dogs, Laika and her companions.

* * *

There is still just time to register for the Pittcon, the 18th World Science Fiction Convention, to be held at the Penn-Sheraton Hotel, Pittsburgh, Pennsylvania, over the coming Labor Day week end. For that matter, you can just show up and register when you arrive, but if there's a real crowd you may have some trouble getting rooms at the special convention rate.

Isaac Asimov is toastmaster at the banquet, with James Blish as principal speaker. There will be the traditional masquerade, the awarding of "Hugos", plays by pro and fan groups, and a great variety of panels and speakers. Hal Clement, Philip Jose Farmer, Willy Ley, Frank Belknap Long on H. P. Lovecraft, Harlan Ellison on SF in the sophisticated men's magazines, discussions for collectors, fanzine editors—you name it and the Pittcon will have it. One highlight will be first of what we hope will be many exhibitions of the work of the country's best fan-artists.

The third pre-convention Progress

Report will be in the mail about the time you see this. $2 to Dirce S. Archer, Pittcon Committee, 1453 Barnsdale Street, Pittsburgh 17, Pennsylvania will bring it to you, along with the two previous issues and the program booklet. And although we're a little light on art work this year, there's probably the most remarkable collection of manuscripts ever offered at a convention auction, to make the collectors' mouths water and their check-writing hands quiver.

See you in Pittsburgh over Labor Day.

PAGAN PASSIONS, by Randall Garrett and Larry M. Harris. Beacon Books No. 263. 158 pp. 35¢

This is one of the galaxy selections in their new guise: sexed-up reprints of science-fiction novels. However, I think it's an original rather than a reprint, and it should be considered sex fantasy, since its thesis is that the Greek gods return to Earth and set up a new "Golden" Age. William Forrester, acolyte of the intellectual Athena, finds himself drafted as a stand-in for Dionysus and obliged to go through a series of predominately sexual trials of prowess.

I'm sure this is an original, because I don't think any present SF or fantasy magazine would print it. If you want sex broadly and well handled as a legitimate part of a science fiction adventure yarn, try the Beacon reprint that followed this, Poul Anderson's "Virgin Planet." That one is in the class with Sprague de Camp's "Rogue Queen," if a bit less serious. This is only for completists.

IS THERE INTELLIGENT LIFE ON EARTH? by Alan Dunn. Simon and Schuster, New York. 1960. 118 pp. $3.50

This is a report written by three members of the Senate of Mars, who have been sent to investigate odd goings-on on the third planet. On their own world, organic life has been dispensed with for some 1,001,959 years, since the time when the Infinitron in Detroyt stopped making consumer goods and started making mechanical Martians. Now, invisible except to dogs and a few others, they have come to size up Earth.

In inimitable cartoons and accompanying, dead-pan text the *New Yorker* cartoonist takes our society apart. Practically any of the cartoons could stand alone—"So much for the moon race. Our rocket's caught in a traffic jam on U.S. 1"—but with the running commentary by the Kolumbo of Space, they bite twice and deep. And as in all good studies of this kind, the original question remains unanswered.

SHARA-LI, by Clyde Andre Castilla. Clear Thoughts, 947 N. La Cienega, Hollywood 46, California. 1958. 100 pp. $2.50

Collectors, I suppose, will want to know about this privately written

novelette in hard covers, which the sender assures me has "been well liked here on the West Coast and in schools." That note about the schools bothers me; I can see no conceivable reason why they should have anything to do with it.

It is the kind of old-fashioned story that might have gotten into one of the popular magazines of forty years ago, or earlier. The narrator is the reincarnation—or rather the projection into a modern body—of a young Atlantean of twenty-seven thousand years ago. He is sent to the Atlantean capital, Shara-Li, to get an education . . . falls in love with the beautiful princess . . . discovers the approaching runaway planet that will destroy all life on Earth . . . helps plan a great flying saucer in which to send a few refugees to Mars . . . witnesses the final cataclysm—

That note about the schools suggests that the author may consider this some sort of occult revelation, and be promoting it as an authentic picture of the past. If it were well written, it might do some harm; as it is, I'm sure only the most cracked of pots will think there was a Shara-Li in the closing millennia of the Wisconsin ice age.

FOUR FROM PLANET 5, by Murray Leinster. Gold Medal Books No. S-937. 160 pp. 35¢

This was "Long Ago, Far Away" when it was in *Amazing* last September, and it is good but routine Leinster. For the record, the cover blurb is off on several counts: the four children who pop up in Antarctica are *not* from Planet 5, the destroyed world between Mars and Jupiter that exists as the asteroid belt, and they are *not* telepaths. True, some of the people with whom they become involved think that these things are so, but not for very long.

Four children, as I've said, appear out of nowhere or nowhen, in a flying saucer that is destroyed when they attempt to signal for help. They are promptly dragged back to the United States and hidden away, while the military try to probe and pry their "secrets" out of them. Are they forerunners of an interstellar invasion . . . spies from the past . . . wanderers from the future? And what will happen when their rescuers find them?

It's an unpretentious tale, told with Leinster's professional smoothness, but much less fun than his various "landing grid" yarns of the Colonial Service, Medical Service, et al.

STAR SCIENCE FICTION NO. 6, edited by Frederik Pohl. Ballantine Books No. 353K. 156 pp. 35¢

These occasional collections of original short stories and novelettes have been good, but this one isn't up to some of the earlier volumes, nor is it all science fiction.

C. L. Cottrell's "Danger! Child at Large" opens the book and is its most powerful story. Anyone who has seen the ruthlessness of children can im-

agine the horror inherent in the frightened eight-year-old with terrible psi powers, who burns and kills and maims in instinctive self-protection, without intent and without control. Tom Purdom's "The Holy Grail" is a thoroughly convincing picture of a thoroughly nasty future society, mentally twisted to its roots. But to offset this torment, Gordon Dickson's "The Dreamsman" is a wholly delightful little yarn about psi-sensitives and a very strange old man, and Miriam Allen DeFord's "Press Conference" is another example of rare humor with a twist at the end.

Two of the eight stories—"Twin's Wail," by Elizabeth Mann Borgese, and "Angerhelm," by Cordwainer Smith—strike me as fantasy. The first is an unexplained variant on the old idea or superstition that twins are psychically connected. It is deftly and fascinatingly put together, as might be expected of a daughter of Thomas Mann, but as unexplained as Poe's "William Wilson." "Angerhelm" is also a nice piece of story-craft, but appears to be hung on the assumption of survival after death.

The two remaining stories are "To Catch an Alien," by John J. McGuire, and "Invasion from Inner Space," by Howard Koch, who did the script of the famous Orson Welles "War of the Worlds" broadcast. The first is a good but not outstanding problem yarn, again of the type that used to be typical of this magazine, and with a twist in motivation. The second is a mild satire on our present tension-oriented world, and the computer revolution that finally brings it to an end.

It's better than the average magazine issue for which you pay the same price, but I doubt that any of the eight stories, except possibly Cottrell's or the two humorous bits, will get space in later anthologies.

THE MAN WITH NINE LIVES, by Harlan Ellison

A TOUCH OF INFINITY, by Harlan Ellison. Ace Books No. D-413. 131 + 123 pp. 35¢

Harlan Ellison has made himself so important a personality in the science-fiction world, that it is hard to see why we haven't had a book from him before. This first volume consists of a novel, put together from a rather short "novel" in *Amazing* and a novelette in *Science Fiction Adventures,* and for the flip half, a selection of six short stories from various magazines, embellished by the author's comments.

On the basis of this book, the author is better at short stories than at novels—something that can be said of many a science fiction "great." He writes with abundant energy, in high key, and sets a pace of sheer action that is hard to maintain to the greater length. He may be impatient with detail at times—for example, I don't see scooping up the falling creatures of "The Sky Is Burning" by "suction" in the near-vacuum of the stratosphere or the exosphere—but drives through such hedges by pure momentum.

I think I like "Life Hutch" best of the short stories, and it is a classic problem yarn of the kind that used to be born here every month. The life hutch concept itself—stocked survival stations scattered through Man's part of Space—is something that deserves to be adopted in fact, and certainly made a stereotype in space fiction. Here the problem is to outwit a robot that attacks any moving thing. "Blind Lightning" is another problem story, and a more human one, with a believably presented outworld beast that must be taught a new philosophy. "Final Trophy" gives us a flashlight picture of a strange culture, but has a predictable gimmick end. "The Sky Is Burning" is also a gimmick story, with its ET's raining out of the skies to self-destruction.

Two stories are episodes in a galactic war between the space empire of the Kyben and that of men. In the longest, "Run for the Stars," a derelict is left behind on a captured world as a human time-bomb, and finds a savage solution to his problem of survival. "Life Hutch" is also a vignette from this tentative future.

Finally, "Back to the Drawing Boards" is another gimmick yarn, using the compound-interest twist of H. G. Wells' "When the Sleeper Awakes" and Harry Stephen Keeler's "John Jones's Dollar," and speeding along at a pace that ignores the flaw inherent in all three stories —that investments and values are a product of society, and no society would let itself be crippled just to maintain an illusion of integrity.

Inherent in all these stories, and in the novel as well, is the attitude or philosophy which the author claims motivated "Life Hutch"—that "we're all alone, from the day we're born till the day we die." He's changed his philosophy, but it colored these stories except perhaps for "Blind Lightning."

"Man With Nine Lives" is a vengeance story, intricately put together, and with the fruitful picture of a society which implants the minds of its troublesomely aggressive individuals in the bodies of men and monsters on other worlds, while their bodies lie in "deepsleep" on a prison planetoid.

In this way Manuvac, the machine that controls human society, is shaping the future in which its puppets will live. Cal Emory's passionately stupid feud with Lederman, in the first third, may lose your interest, but the story picks up speed as Emory lives out his lives on other worlds—as a lizard on Spyna—as an assassin in the court of the galactic conqueror, Delpheron —as a prophet of war on a planet of peace—as a rock crawdad on an asteroid.

When Harlan Ellison invents a society that makes him as mad as his own does, he may give us a science-fiction novel to remember.

Just now he's letting drive and momentum carry him over rough spots.

MOON BASE: TECHNICAL AND PSYCHOLOGICAL ASPECTS, by T. C. Helvey. John F. Rider, Inc., New York. 1960. 72 pp. $1.95

This paperback by the Principal Biophysicist of the Research Division of Radiation, Inc., is packed with enough suggestions to keep realistic sf writers going for months and to drive our rump-dragging bureaucrats into something close to rabies. Like Wernher von Braun's prescriptions for a mass assault on Mars, and Hermann Oberth's for a Moon-traveling pogo stick, the proposals combine the audacious with the pragmatic. The author's suggestion that the ideal first crew for a lunar base will consist of two men and a woman has already attracted the Sunday supplements.

What Dr. Helvey is proposing is a simulated Moon Base, set up on Earth to train the crews for an actual base, and to find bugs in our apparatus and our system for using it, before it is too late to apply remedies.

Before a crew's tour of duty in the mock-up base—complete with a Bonestell moonscape or its equivalent painted on the inside of the thirty-five-foot sphere that serves as an evacuated exercise yard—has been completed, Dr. Helvey thinks they will believe they are actually on the Moon.

If the matter-of-fact discussion of the performance to be stewed out of the immolated crew reminds you of squirrels racing as hard as they can to stay in one place, I'm afraid that's no coincidence. The Moon Base, real or simulated, will be no place to indulge in unproductive hobbies.

GALACTIC CLUSTER, by James Blish. Signet Books No. S-1719. 1959. 176 pp. 35¢

The eight stories in this excellent collection include the by now very well-known "Beep," the going-to-be well-known "A Work of Art," which is one of the author's top bits of practicing what he preaches and putting real people into stories, and a little cluster of novelettes that make me suspect that another welded-together novel or story-sequence like the "Okie" series is in the making.

These latter stories are parts of a greater whole that we can't yet see. For some reason—perhaps the author's, perhaps the publisher's, perhaps by chance—they do not fall together in the book. "Common Time" is a technically tangled story about the strange time confusions undergone by a man in a faster-than-light ship, and whereas it has its own values—mainly the reader's trying to decide what is going on, and how the author will explain himself out of the mess—it is also clearly the curtain-raiser for another Blishian view of the Universe, like the one with which the Okie sequence came to its smashing close.

The story is taken up, and the picture rounded out a little more, with "Nor Iron Bars"—two stories made into one—in which another kind of faster-than-light ship finds itself in an atom which is itself a

strange kind of solar system, then far across the galaxy, then at its goal. Here is proof that a theme that everyone supposed had been killed by Ray Cummings—the world-in-an-atom—can be brought to life. The closing story, "This Earth of Hours," carries the sequence still farther into the future and introduces more modifications of the author's growing picture of the Universe, as a war fleet from Earth comes up against the strange, telepathic worm-race that controls the whole center of the galaxy.

All these stories are, in a sense, "hard science" fiction—quite as "hard," let's say, as Hal Clement's "Mission of Gravity," although the author has created most of his own science, extrapolating from suggestions in that of our own time, much as Dr. E. E. Smith and John W. Campbell, Jr. once did.

We also have with us the author who realizes that stories are about people and their problems, and that the more understandable these problems are, the easier they get under our skin. "A Work of Art," if you have somehow missed it, is one of Blish's best stories. We live with the composer Richard Strauss, who has been recreated by the mind sculptors of the Twenty-second Century, and who tries to go on from where his death had stopped him. And we know, though the mind sculptors never do, just how short of success they have come. "Tomb Tapper," which opens the book, was here in 1956; again it gives us people, in the Civil Air Patrol squad who have the gruesome duty of reading the dead minds of crashed Russian fliers, and who come upon a mind that is inhumanly strange.

Two stories are left. "King of the Hill," quite short, shows us a man cracking up on an armed satellite, and convinced he has orders to drop three H-bombs on Washington. A psychologist, not a physicist, finds an answer. "To Pay the Piper" presents the aftermath of a bacterial war, with Mankind dug in and mutated bacteria and viruses making the surface deadly. A way is being developed to get a few men back on the surface, but politicians and laymen alike won't wait. And there are infiltrated enemy agents to find and block. Again, a technical puzzle is solved in terms of human values and frailties.

THE PEACEMAKERS, by Curtis W. Casewit. Avalon Books, N. Y. 1960. 224 pp. $2.95

This is by a long way the best book Avalon has had since it began publishing science fiction—not so much for the theme, which is another world-after-the-atomic-war variant, but for the way the story is handled, the reality of the principal characters, in short, the writing.

In a way, the book is like Verne's "The Begum's Millions," in that it gives us two future societies, founded on different principles, and sets them at each other's throats. The similarity doesn't go much farther, however,

for we see only the "bad" society and form our opinions of its neighbor only by the propaganda used to storm up a war against it.

The two are near-island communities at opposite ends of a dumb-bell shaped island: Rockland, industrial, and Sunland, agricultural. To Rockland comes a shipload of scientists, gleaned from the debris of the war-battered world and promised an opportunity to help remake a peaceful society. But the reality at once turns out to be different from the promise. Rockland is controlled by a chairborne American lieutenant, Herbert Puckett, who makes himself a general, assassinates the Premier of Rockland, and with the help of a venomous chief of secret police, Dolusi, methodically begins to whip up war against Sunland.

The scientists are there for one purpose: led by a German Quaker, Dr. Lindemann, they are to make "tabun," a nerve gas that will be sprayed on Sunland in the guise of insecticide. The book's unheroic hero, Rick Ames, fights against this horror and against Lindemann's willingness to comply, only to learn that the Quaker hopes to fool Puckett by making "Sympathone," a gas that takes the aggressiveness out of men and animals, rather like the comet-tail in H. G. Wells' "In the Days of the Comet."

Ames is almost the least real of the characters, and he, too, is satisfyingly complex. Puckett, Dolusi, Dr. Lindemann, Odetta Savoyol, the demon-driven leader of the opposition to Puckett—they are all brought before us with skill and compassion, and act as people, not as puppets. If the action grows a bit confused in the final chapters, I suspect that Avalon's Procrustean policy of fitting all books to a standard length may have destroyed some of a skillful author's continuity. Perhaps, as with Robert Sheckley's "Immortality Delivered," the eventual paperback edition will be even better.

STORM OVER WARLOCK, by Andre Norton. World Publishing Co., Cleveland & N. Y. 1960. 251 pp. $3.00

You will have to look for this new planetary adventure book in the juvenile department, and you're foolish if you let mistaken snobbishness keep you from getting it. I don't feel that it's quite up to Andre Norton's best, but nobody is writing better "sense of wonder" science-fiction adventure these days. Give the hero a few more years, and it would be "just another" adult book—and sell fewer copies. This way, a good many youngsters are going to discover that science fiction can be fun, their teachers will discover that it can be well written, and occasional adults will start watching for the Norton name.

Shann Lantee, a boy from the slums of a minor planet, has managed to make himself a place in the survey team that is planting a Terran post on Warlock, only habitable

planet of a star that is also being scouted by the beetlelike Throgs, a hostile race of galactic imperialists every bit as determined as Man. The book begins as a Throg raid wipes out the survey camp. Only Shann, who has been in the hills hunting for a pair of escaped wolverines, survives the raid. He encounters a Terran scout, Ragnar Thorvald, and the two begin a peculiar struggle to evade the Throgs and to reach some undefined goal in the distant sea.

There is more of a mystical element in the book than in the author's others. Both men are troubled by strange dreams that seem to have been sent to them. There is evidence of a hidden native race—and when it finally comes into view, it is a very strange race, mentally rather than technologically powerful.

The symbiotic relationship between Shann and the two mutated and selectively bred wolverines, Togi and Taggi, is also nicely developed. It recalls the author's recent "Beast Master," where this idea was more fully developed, and I suppose can be traced back to the Dogs of Simak's "City," or to Mowgli, or to the beast-companions of many a hero of legend.

I hope Andre Norton's books, for whichever publisher and under whatever name, keep on appearing and selling for a long, long time.

FIRE PAST THE FUTURE, by Charlets Eric Maine. Ballantine Books, New York. 1959. 160 pp. 35¢

...is is by far the author's best science-fiction story, although it draws its strength from its mystery and suspense elements rather than from its SF theme, which merely sparks the plot.

In *Amazing Stories* and the British *New Worlds Science Fiction,* the story was called "Big Countdown." A group of scientists are isolated on a Pacific isle for the test of a new nuclear device, "Agnes"—short for Anti-Gravity Nuclear Energy Supply. When the end of the three-day countdown is reached, Agnes will accelerate a rocket past the speed of light, and anything may happen; their theories break down.

But a strange blip appears on the station's radar, and the hero, photographer Russ Farrant, sets off with the Intelligence officer to find out what has caused it. They find a buried cylinder, and Russ bashes in the other man's head, buries him, and promptly forgets what he's done, and why he did it.

This the reader watches; from there on, he knows only what Farrant knows. Member after member of the countdown team is killed. Evidence is contradictory. It begins to appear that there is someone or something else on the island, trying to stop the test—perhaps a Russian agent, perhaps a killer out of space or time. The suspense is piled up nicely, and the purpose of the slaughter concealed until late in the book.

BRASS TACKS

Dear Mr. Campbell:

I have read ASF, with the exception of about two issues, since 1938 and have looked over collections of earlier issues. I have also read about every other science-fiction magazine since then.

May I say here and now as a fan who likes science FICTION and SCIENCE fiction and non-horror fantasy that I approve one hundred per cent of the title change. Cheap pulp adjectives have always annoyed me. I do not want to see ASF converted to an all-fact magazine, but I do think photos and clear art are important to convey ideas and to arouse interest in this visual-minded age. Therefore, the changes are good. You can tell your readers that now the articles take less room from the fiction.

You aren't going to receive many kind words about ANALOG. I've learned that in spite of surface indications to the contrary the average science-fiction reader resists improvement and change more strongly than the "average man on the street." You can convince the average man on the street that a "change" will mean more comfort or money for him. The science-fiction fan is not only hep to that argument, but he, above most of mankind, knows that change means: "that which he found pleasure in in past years seems to be slipping between his fingers and he is reluctant to move his fingers to grasp a new form." (They want to run a freeway right

through our rose bed!) (It's too much trouble to sell the house and move and make an even better rose bed.)

I like science fiction because it is the greatest potential media for experiments, changes, new ideas—a field of foresight instead of hindsight; a field that will become greater when it realizes that it must maintain all the intelligence it has *but* add, not human character, but human personality to its stories.

It is just as hard for me to wait for an issue of ANALOG now as it was ASTOUNDING in 1938. Good luck —Rosco Wright, 237 Myoak Drive, Eugene, Oregon.

We all approve of change—when it's the other fellow's rose bed!

Dear John:

Gad! A dear John letter! Nope, it isn't a forever farewell, but a chance to poke a couple of big holes in somebody else's story. Namely, Rick Raphael's "Make Mine Homogenized." It ain't out of meanness, though. I enjoyed the story without jealousy. Wish I'd written it.

If the cow, Sally, gave colostrum like that what would her milk have been when she really came in? For a cow gives milk that's no good anyway for the first half dozen milkings. 'S a fact. If you have 4,388 farmer readers, you've had or will have 4,388 letters saying so . . .

And why did they wait to breed her until she dried up on her own-some lonesome? That isn't done either —two hundred eighty-five days of production lost from each cow would soon break the best of dairy farmers. (That's assuming she'd be in heat about as soon as her lactation period was done.)

A cow is bred with an eye on her normal gestation period of two hundred eighty days to produce within planned limits about once a year. There is leeway. Her milk is thrown away until the colostrum yield turns to real edible milk. I know this much —and have never been a farmer. But I was a country preacher. I was a writer once, too. And still have scars from inadequate research.

The story? I enjoyed it. Even those fowl indignities. But the milk run and the udder failure . . . When's he gonna writhe anudder one?—Kenneth H. Cassens, P. O. Box 142, Rockland, Maine.

But you must remember, Sally wasn't any ordinary cow.

Dear Mr. Campbell:
Re ANALOG

In the days of BEM science fiction the name Astounding was very appropriate for the fictional dreaming of the day, by the lay.

Today there is no scientific laity, only degrees of those with the least scientific knowledge—who are the most sure there is Truth about somewhere—and those with professional stature—who are not so sure Truth

has a valid, semantically understood meaning.

I think we are all aware of the growth in professional readership and more orderly scientific thinking by our authors expressed as ANALOG Science Fiction. As one who has made the BEM transit with Astounding, I welcome the new name ANALOG—and forever be damned those who need to retain the status quo, for it's imagined self and without qualification, to support a figment of personal security which is otherwise without orientation—Lee Avera, Alameda, California.

It's a curious thing that readers have long accepted that lack-of-change is proof of a static and/or decadent system—yet object so loudly when the principle is applied!

Dear Mr. Campbell:

I just received your March 1960 issue and read with extreme interest your comments on page 168 to the letter of Mr. George W. Price of Chicago, Illinois. The first paragraph:

> "The essence of achieving industrialization is to work and produce capital goods, instead of consumer goods—to produce tools instead of products—until you have an industry."

applies definitely to the current industrialization program underway in Argentina under the direction of Mr. Alsogaray and his team of experts. Based on some comments made by Mr. Alsogaray to the press as well as to his TV audience, I assume that he is fully in agreement with the above statement.

The problem in Argentina is naturally as outlined in your last paragraph

> "Today, of course, we strongly reject the idea of someone compelling the people to do what they do not want to do."

The result of the coming April elections in Argentina will be the measure of the fatalism apparent in your last statement. If the Argentine people back up the current program, they will show a willingness to sacrifice immediate prosperity for tomorrow's prosperity while building up their industry.

I shall write to you again in April. —George H. Muller, Buenos Aires, Argentina.

A leader is someone who gets the people to do what must be done, but which they do not want to do. If they wanted to carry out the necessary chore, they would not need a leader.

Dear John:

Some time ago a story appeared, probably in Astounding, which had to do with a prospector who dabbled in the construction of "psi" devices

which were intended to aid him in prospecting. He found that he himself was unable to get results with the devices, but that others were successful.

He, the inventor, regarded the device as a "psi" machine and knew what was in it; his friend regarded it as a mysterious but sure-fire piece of advanced scientific equipment and for him it worked.

Now, following the same line of thought, the hero of "Despoilers of the Golden Empire" believed that his race had a working knowledge of the basic secret of the cosmos, to quote the story. As a member of the same "Universal Assembly," I hold to a like belief.

I make use of the same highly effective "symbol patterns" and possess—and use—a relatively simple but remarkably efficacious "psi" machine of a type which has been used by members of the Universal Assembly for long years—a rosary. The use of this device involves twenty to thirty minutes of semihypnotic concentration.

My point is this: This "psi" machine, invented by a skilled adept in the higher circles of the Universal Assembly, is *not* regarded as a "psi" machine by me or any other user. On the other hand, the various half electronic, half symbolic psi machines which I have constructed don't work very well.

The best—or at least the prettiest—incorporates relays, flashing lights, schematics, and a meter relay which starts the whole shebang off with a current fluctuation of three microamperes. I think maybe it's just a sort of crude polygraph—lie detector.

I have a feeling that investigation will disclose, eventually, the only really efficient "psi" machine to be a completely static device—no moving parts, no electronic components. What form will it take—an abstract drawing or painting, a set of symbols on a plastic card, a page of print? Meanwhile, I'll stick to the rosary because, you see, it *isn't* a psi machine. Is it?—Michael O'Connell, North Chicago, Illinois.

Yes, Mike, it is! It has aided many a human being to achieve things at a nonphysical level that he could not have done without its aid. Right? And—it is a static device.

Dear Sir:

In his switching back and forth between the centuries, Mr. Randall Garrett—"Viewpoint," April 1960—seems to have lost his way slightly. The traditional name of the minstrel who discovered Richard Coeur-de-Lion in prison was Blond*el*—not Blond*in*. Blond*in* was the celebrated nineteenth-century French tightrope walker, who made several crossings of Niagara Falls.—Sebastian Robinson, St. Philip's, Byne Close, Storrington, Sussex, England.

Garrett was walking a tightrope across the centuries and missed his step!

Dear Mr. Campbell:

I just finished Richardson's article on Mars in the March *Analog,* and it was terrific.

There is, however, something about that article which surprises me. Mr. (Dr.?) Richardson states that "the W marking is hopeless". Not at all, sir, not at all! You have been looking through a telescope so long that you have forgotten that a telescope inverts the image. The W is actually an M. M for Mars, that is.

The M looks artificial. It is quite possible that it is. The so-called canals look artificial, too. Considering the extreme adaptibility of the human physical and mental equipment to varying degrees of temperature, pressure, humidity and gravity, it is quite possible that human life exists there, along with all those lichens, and if not human, at least a high form of intelligent life.

We have been trying to contact Mars by radio ever since we had radio, and almost every time we have tried we have received strange signals from somewhere in code—not Morse or International. (For some of these records try the radio section of the Bureau of Standards.) We have, of course, assumed that they did not come from Mars, since we cannot conceive of Mars having anything but a low form of vegetable life. This is on a par with our "scientists" who bounced radar off the moon, found that the signal returned before they expected it to—thus indicating that the moon was closer than we thought it was—refused to believe it, and kept bouncing radar until they hit something which was where they expected the moon to be, whereupon they announced we had hit the moon and it was exactly where we thought it was. Which to me, just hain't scientific.

Let me postulate you a theory on the bluemist dispersal. Mars is inhabited by an old civilization, so old they have learned to control the weather. Soooo, every time they get close to us they clear up their atmosphere so *they* can get a good look at *us*. I don't think this theory is any nuttier than that volcanic ash theory for the maria. And just as unprovable, until we hit the surface of Mars and take a good look for ourselves.—Betsy G. Freitag, 6100 Inwood Street, Cheverly, Maryland.

To paraphrase an old question: "If they're so smart—why ain't they here?"

Dear Sir:

November "we don't know how we did it!" and March's three letters covering the quotation.

One thing has not been mentioned which has quite a bearing on what has been learned regarding our progress from primitive to industrial —the over a hundred utopias or community undertakings or working together for the common good—Brook Farm, Owenites, Oneida Community, et cetera, which were tried out after the American Revo-

lution up to around 1860. Europe used America as a testing ground. Some of these undertakings were quite elaborate. Regardless of all the hopes, ideas and plans, human nature seems to have wrecked them mostly. Understand there is one, the Hutterites, still operating in the Dakotas and property is held in common, still.

The Hopi Indians still live pretty much in a Stone Age Culture here in Arizona, property mainly belonging to the tribe. Most of the difference between a Stone Age Culture and Civilization or whatever we want to call it, is the development of tools and their use. With all these examples, we should certainly be able to draw conclusions about Communism and Socialism and learn what Truth is. Belief and Faith tend to become Truth to us but still are only opinion, no matter how strongly held, unless they are Truth in fact—W. C. Everett, Winslow, Arizona.

The essential—and always denied! —fact is that every culture that ever was or ever will be is simply another effort toward a Utopian colony!

Dear Mr. Campbell:

Greetings for the new decade and congratulations on Astounding/Analog's new format. I have been meaning to write you since January of this year but I am afraid that I needed the goad of Mr. John Chertok's letter before I took action.

With your permission, I will now convert the rest of this letter to a short tirade on the shortcomings of our Washington Bureau-Aristocrats.

A recent financial column in the San Francisco *Examiner* noted that, while the general stock market was in its usual state of unease and fluctuation, office equipment stocks were riding steady and firm. This, the column stated, was due to the fact that bookkeeping has grown out of all proportion to the actual increases in industry. Industrial workers have increased by eighty per cent in the last twenty years while office workers have increased by almost four hundred per cent! I wonder if this lonely little fact might not have something to do with the general off-beat tone that is prevalent in our works and our world of today.

As a general observation, bureaucrats are not men of action, but those who keep tabs on the actions of other men. This outlook, I feel, does not make for any special brilliance in formulating high-level decisions. Any more than does a gift for writing reports help kindle that spark called statesmanship.

I am ignoring the major part of Mr. Chertok's letter. In essence, it was only the old and often reiterated plea for more regimentation, a bigger and more ponderous government, and—though he did not quite say so—undoubtedly more money. As a lone and humble observer, I would like to point that it is not *always*

necessary, when you want to boost the performance of the engine, to keep tacking on more and more kerosene-burning pistons.

Sometimes, a change in the design helps.

If anyone is now considering a new design for our internal and foreign policies, and—from the tone of Mr. Chertok's letter, and other evidence such as news-plants—I suspect they are, I would like to remind these planners of two qualities that seem to have gotten overlooked recently. They are: Initiative and Ingenuity.

I would like to suggest a handy rule of thumb where ingenuity is concerned: "For every problem proposed, there exists a rock-bottom minimum of solutions. This number is equal to all combinations of all pertinent facts contained in the problem, as well as the combinations of all associative facts that are in some way connected to the pertinent facts."

Obviously, the total of all random combinations of this sequence or class is astronomical. To call the total a billion would be intensely conservative. Out of that total 99.99% will, of course, be inapplicable or, more likely, just gibberish. But a residue of one hundred semi-applicable solutions to one problem is not bad, certainly. Particularly when ten of them will work like a charm.

A shotgun technique like that, naturally, is rarely if ever needed. More often the items presented in a problem will cancel themselves out, or provide the means for their own solution. A good example: the '57-'58 Quemoy dispute that has still not been conclusively settled.

Basically the problem read:

a) Red China did not want the Nationalists to hold the Quemoy group of islands which were only three miles off her shore. They were too good a spot from which to launch an attack.

b) The Nationalists did not want the Red Chinese to hold the Quemoy group for strikingly similar reasons.

c) Our concern was with the defense of Formosa, to which we were committed. But more, we were concerned with the problem of keeping the Quemoy contention from detonating into a major, megaton-bomb tossing war.

One solution for the problem instantly comes to mind when one recalls that megaton-bombs sink islands, or at least small islands such as the Quemoys. It seems like a rather neat solution, inasmuch as it is hard to picture an island that is a hundred feet under water being used to launch an attack on anybody.

I would like to add, with haste, that I do not propose the random dropping of H-bombs to cure all our predicaments. I am attempting to boost the ingenious method, not the sledge hammer means. It is obvious to everyone that reads his morning newspaper that the problem facing us in the next ten years will be how to keep that first bomb from dropping, ever.

Again, as Eric Frank Russell has so beautifully pointed out, one entire set of problems—those of the attack variety—solve themselves with speed and efficiency once you apply the method of the Judo master. Take them in the direction that they want to go, only do it with an extra, gentle push of your own. As anyone who has seen a *rondori* match knows, the results of an ounce or so of pressure, used to help, not oppose, your opponent—well, the results can be spectacularly decisive.

Question: Bearing this in mind, does anyone have some suggestions on the current and much-deadlocked Disarmament talks?

Finally, in my pitch for ingenuity as opposed to bigger-statism, I would like to point out that the American way of life—as it actually exists, not as pundits and politicos like to speak of it—has one quality that all of its self-named adherents pitifully lack. I mean, of course, the American sense of humor.

Those who have read Robert W. Service's "The Iceworm Cocktail" will know immediately what I am talking about. To those who haven't, I think I need only remind them that the song "Yankee Doodle" came from the British aristocrats originally and who, much better equipped and trained than the colonial "rabble," regarded fighting the Union forces as a sport slightly inferior to fox-hunting. And if that doesn't do it, perhaps I should mention the GI's who were held prisoners of war by the Japanese in World War II. The Japanese were eager to buy sulfa tablets from the GI prisoners of war. And the GI's were glad to oblige—with home-made sulfa tablets, consisting of just one ingredient; plaster-of-paris. The Japanese never knew the difference.

In essence, and as it has been said many times before, the fight we are in now is a fight for men's minds. That means being able to understand them first. And then find a winning way to get them on your side after that.

Ivan, the communist-culture salesman, is a beautiful target. One, because he is bound by the dictates and dogmas of his Politburo; two, because he is so beautifully and innocently sincere in his belief.

He could, with the methods of the Marx Brothers, not doctrine a'la Marx, be made to take the biggest pratfall in history.

I guess I never did get around to saying anything about the first part of the formula: Initiative. I guess the only thing that needs to be said is this: Initiative and original, critical thinking seem to go hand in hand. After all, initiative is only another way of saying courage. And might that not be the real problem, after all?—Hugh Leeds, San Francisco, California.

But . . . you're not approaching this great problem in the proper serious frame of mind! This would never do!

(*Continued from page* 82)
would go to Wersgorixan and reveal the truth about us. Then, if necessary, the foe could recruit enough French or Saracen mercenaries to destroy us; but probably the demoralization of our allies, as they learned our weakness, would suffice to bring them to terms. In either case, Sir Roger would never see his wife and children again.

Lady Catherine entered the screen. I recall her words. But I do not choose to write them down. When the record was ended, I wiped it out myself.

We were silent a while, my lord and I.

At last: "Well," he said, like an old man.

I stared at my feet. "Montbelle said they would re-enter communication range at a certain hour tomorrow, to hear your decision," I mumbled. " 'Twould be possible to send numerous unmanned ships, loaded with explosive fused by a magnetic nose, along that far-speaker beam. Belike he could be destroyed."

"You've already asked much of me, Brother Parvus," said Sir Roger. Still his words had no life in them. "Ask me not to slay my lady and children . . . unshriven."

"Aye. Ah, could the vessel be captured? No," I answered myself. " 'Twould be a practical impossibility. Any single shot which struck close enough to a little ship like that, would more likely make dust of it than merely disable its engines. Or else the damage would be small, and he would at once flee faster than light."

The baron raised his congealed face. "Whatever happens," he said, "no one is to know my lady's part in this. D'you understand? She's not in her right mind. Some fiend has possessed her."

I regarded him with a pity still greater than before. "You're too brave to hide behind such foolishness," I said.

"Well, what can I do?" he growled.

"You can fight on—"

"Hopelessly, once Montbelle has gone to Wersgorixan."

"Or you can accept the terms offered."

"Ha! How long d'you think the blueskins would actually leave Terra in peace?"

"Sir Owain must have some reason to believe they will," I said cautiously.

"He's a fool." Sir Roger's fist smote the arm of the chair. He sat up straight, and the harshness of his voice was a lonely token of hopefulness to me. "Or else he's a blacker Judas than he has even confessed, and hopes to become viceroy after the conquest. See you not, 'tis more than the wish for land which'll force the Wersgorix to overrun our planet. 'Tis the fact that our race has proven itself mortally dangerous. As yet, men are helpless at home. But given a few centuries to prepare, men might well build their own spaceships and overwhelm the universe."

"The Wersgorix have suffered in this war," I argued feebly. "They'll need time to regain what they have lost, even if our allies surrender all occupied worlds. They might very likely find it expedient to leave Terra alone for a hundred years or so."

"Till we're safely dead?" Sir Roger nodded heavily. "Aye, there's the great temptation—the real bribe. Yet would we not burn in Hell, if we thus broke faith with unborn children?"

"It may be the best we can do for our race," I said. "Whatever lies beyond our own power is in the charge of God."

"But no, no, no." He twisted his hands together. "I can't. Better to die now like men . . . Yet Catherine—"

After another stillness, I said, "It may not be too late to dissuade Sir Owain. No soul is irredeemably lost while this life remains. You could recall his own honor, and point out to him how foolish it is to rely on Wersgor promises, and offer him forgiveness and great position—"

"I'd far liefer spill his evil brains. But perhaps . . . aye, perhaps a talk . . . I would even try to humble myself. Will you aid me, Brother Parvus? I must not curse him to his face. Will you strengthen my spirit?"

XXI.

The next evening, we departed New Avalon.

Sir Roger and I went alone, in a tiny unarmed space lifeboat. We ourselves were but little stronger. I had my cassock and rosary as always: no more. He was clad in a yoeman's doublet and hose, though he wore sword and dagger and his gilt spurs were on his boots. His big form sat the pilot chair as it were a saddle, but his eyes, turned heavenward, were full of winter.

We had told our captains that this was only a short flight to view some special thing Sir Owain had fetched. The camp sensed a lie and rumbled with unease. Red John broke two quarterstaffs before he restored order. It seemed to me as I embarked that our enterprise was suddenly rusted. Men sat so quiet. It was a windless evening, our banners drooped on their staffs and I noticed how faded and torn they were.

Our boat split the blue sky and entered blackness, like Lucifer expelled. Briefly I glimpsed a battleship, patrolling in orbit, and would have been much comforted to have those great guns at my back. But we must take only this helpless splinter. Sir Owain had made that clear, when we talked a second time along the farspeaker beam. "If you wish, de Tourneville, we'll receive you for a parley. But you must come alone, in a plain lifeboat, and unarmed . . . Oh, very well, you can have your friar too . . . I shall tell you what orbit to assume. At a certain point thereof, my ship will meet you. If my telescopes and detectors show any sign of treachery on your part, I'll go straight to Wersgorixan instead."

We accelerated outward through a silence that thickened. Once I ven-

tured to say, "If you two can be reconciled, it will put heart back in our people. I think then they would be truly invincible."

"Catherine and I?" barked Sir Roger.

"Why, I, I, I meant you and Sir Owain—" I stammered. But the truth opened up before me: I had indeed been thinking of the lady. Owain was nothing in himself. Sir Roger was the one on whom our whole fate rested. Yet he could not continue much longer, sundered from her who possessed his soul.

She, and the children they had had together, were the reason he came so meekly to beg Owain's indulgence.

Outward and outward we fled. The planet shrank to a tarnished coin behind us. I had not felt so alone before, not even when we were first borne from our Earth.

But at last a few of the many stars were obscured. I saw the lean black form of the spaceship grow, as it matched velocities. We could have tossed a bombshell by hand and destroyed it. But Sir Owain knew well we would never do that, while Catherine and Robert and Matilda were aboard. Presently a magnetic grapnel clanked against our hull. The ships drew together, portal to portal, a cold kiss. We opened our own gates and waited.

Branithar himself stepped through. Victory flamed in him. He recoiled when he saw Sir Roger's glaive and misericord. "You were to have no weapons!" he rasped.

"Oh? Oh, aye. Aye." The baron

looked dully down at the blades. "I never thought . . they're like my spurs, insignia of what I am . . . naught more."

"Give them over," said Branithar.

Sir Roger unbelted both and handed them to the Wersgor in their sheaths. Branithar passed them to another blue and searched our bodies himself. "No hidden guns," he decided. I felt my cheeks burn at the insult, but Sir Roger hardly seemed to notice. "Very well," said Branithar, "follow me."

We went down a corridor to the salon cabin. Sir Owain sat behind a table of inlaid wood. He himself was somber in black velvet, but jewels flashed on the hand which covered a fire-gun laid in front of him. Lady Catherine wore a gray gown and wimple. She had overlooked a stray lock of hair, which fell across her brow like smoldering fire.

Sir Roger halted just within the cabin door. "Where are the children?" he said.

"They are in my bedchamber with the maidservants." His wife spoke like a machine. "They are well."

"Be seated, sire," urged Sir Owain glibly. His gaze flickered about the room. Branithar had lain the sword and dagger down by him, and stood on his right hand. The other Wersgor, and a third one who had waited here, stood with folded arms by the entrance, just behind us. I took them to be the physician and navigator which had been mentioned; the two gunners must be at their turrets, the pilot up by his controls, in case aught went amiss. Lady Catherine stood, a waxen image, against the rear wall to Owain's left.

"You bear no grudges, I trust," said the recreant. "All's fair in love and war."

Catherine lifted a hand to protest. "In war only." She could scarce be heard. The hand fell down again.

Sir Roger and I kept our feet. He spat on the deck.

Owain reddened. "Look you," he exclaimed, "let's have no cant about broken vows. Your own position is more than doubtful. You've arrogated to yourself the right of creating noblemen out of peasants and serfs, disposing of fiefs, dealing with foreign kings. Why, you'd make yourself king if you could! What then of your pledges to sovereign Edward?"

"I've done naught to his harm," Sir Roger answered, shaken of voice. "If ever I find Terra, I'll add my conquests to his domain. Until then, we must manage somehow, and have no choice but to establish our own feudality."

"That may have been the case hitherto," Sir Owain admitted. His smile returned. "But you should thank me, Roger, that I've lifted this necessity from you. We can go back home!"

"As Wersgor cattle?"

"I think not. But do be seated, you two. I shall have wine and cakes brought. You're my guests now, you know."

"Nay. I'll not break bread with you."

"Then you'll starve to death," said Sir Owain merrily.

Roger became like stone. I noticed for the first time that Lady Catherine wore a holster but that it was empty. Owain must have gotten her weapon on some pretext. Now he alone was armed.

He turned grave as he read our expressions. "My lord," he said, "when you offered to come parley, you could not expect me to refuse such a chance. You'll remain with us."

Catherine stirred. "Owain, no!" she cried. "You never told me . . ."

He turned his fine profile to her view and said gently, "Think, my lady. Was it not your highest wish, to save him? But you wept, fearing his pride would never let him yield. Now he is a prisoner. Your wish is granted. All the dishonor is on myself. I bear that burden lightly, since 'tis for my lady's dear sake."

She trembled so I could see it. "I had no part in this, Roger," she pleaded. "I never imagined—"

Her husband did not look at her. His voice chopped hers off. "What d' you plan, Montbelle?"

"This new situation has given me new hopes," answered the other knight. "I confess I was never overly joyed at thought of bargaining with the Wersgorix. Now 'tis not needful. We can go directly home. The weapons and chests of gold aboard this vessel will win me as much as I care to possess."

Branithar barked: "Hoy, what of me and my friends here?"

Owain answered coolly, "Why should you not accompany us? Without Sir Roger de Tourneville, the English cause must soon collapse, so you'll have done your duty to your own people. I've studied your way of thinking—a particular place means nothing to you. We'll pick up some females of your race along the way. As my loyal vassals, you can win as much power and land on Terra as anywhere else; your descendants will share the planet with mine. True, you sacrifice a certain amount of wonted social intercourse, but on the other hand, you gain a degree of liberty your own government never allowed you."

Branithar yielded.

"And us?" breathed Lady Catherine.

"You and Roger shall have your estate in England," pledged Sir Owain.

Perhaps he thought, once he was the overlord of Europe, he could do as he wished with her husband and herself. She was too shaken to foresee the latter chance. I saw her suddenly enclouded with dream. She faced Sir Roger, smiling and weeping. "My love, we can go home again!"

He glanced at her, once. "But what of the folk we led hither?" he asked.

"Nay, I cannot risk taking them with us." Sir Owain shrugged.

Sir Roger nodded. "Ah," he said.

Once more he looked at his wife. Then he kicked backward. The spur

of knighthood struck into the belly of the Wersgor behind him. He ripped downward.

Falling with the same motion, he rolled across the deck. Sir Owain yelled and leaped up. His fire-gun blasted the air. It missed. The baron was too quick, reached upward, seized the other stupefied Wersgor and pulled him down on top. The second fire-blast struck that living shield.

Sir Roger heaved the corpse before him, rising and advancing in one gigantic surge of motion. Owain had time for a last shot, which charred the dead flesh. Then Roger threw the body across the table, into the other man's face.

Owain went down beneath it. Sir Roger snatched for his sword. Branithar had already put a hand on it. Sir Roger got the dagger instead. It flared from the sheath. I heard the thunk as he drove it through Branithar's hand, into the table, to the very hilt.

"Wait there for me!" snarled Sir Roger. He drew the sword. "Haro! God send the right!"

Sir Owain had scrambled free and risen, still clutching the gun. I found myself a-pant just across the table from him. He aimed squarely at the baron's midriff. I promised the saints many candles and smacked my rosary across the traitor's wrist. He howled. The gun fell from his hand and skidded across the table. Sir Roger's great glaive whistled. Owain was barely fast enough to dodge. The edged steel crashed into the wood. A moment Sir Roger must struggle to free it. The fire-gun lay on the deck. I dove for it. So did Lady Catherine, who had dashed around the table. Our brows met. When my wits came back, I was sitting up and Roger was chasing Owain out the door.

Catherine screamed.

Roger stopped as if noosed. She rose in a swirl of garments. "The children, my lord! They're aft, in the bedchamber—where the extra weapons are—"

He cursed and sped out. She followed. I picked myself up, a trifle groggily, the gun which they had both forgotten in my grasp. Branithar bared teeth at me. He tugged against the knife that pinioned him, but only made the blood run faster. I judged him safely held. My attention was elsewhere. The Wersgor whom my master had disemboweled was still alive, but would not remain so for long. A moment I hesitated . . . where did my duty lie, to my lord and his lady or to a dying heathen? I bent above the contorted blue face. "Father," he gasped. I know not who, or Who, he called upon, but I led him through such poor rites as the circumstances allowed and held him while he died.

Sir Roger came back, wiping his sword. He grinned all over, I have rarely seen such joy in a man.

"What happened?" I asked, rising in my soiled raiment.

"Owain didn't make for the arms chest after all," Sir Roger told me. "He must have turned forward instead, to the control turret. But the

other crewmen, the gunners, had heard the fight. Judging the chance ripe and the need clear, they went to equip themselves. I saw one of them pass through the boudoir door. The other was at his heels, armed with a long wrench. I fell upon him with my sword, but he fought well and it took a while to get him slain. Meantimes Catherine pursued the first and fought him barehanded till he struck her down. Those chickenheaded maidservants did naught but cower and scream, as expected. But then! Listen, Brother Parvus! My son Robert opened the weapon chest, took forth a gun and plugged that Wersgor as neatly as Red John could have. Oh, the little devil-cub!"

My lady entered. Her braids hung loose and one fair cheek was purpled with a bruise. But she said as impersonally as any sergeant reporting an assignment of pickets: "I quieted the children down."

"Poor tiny Matilda," murmured her husband. "Was she very much frightened?"

Lady Catherine looked indignant. "They both wanted to come fight!"

"Wait here," he said. "I'll go deal with Owain and the pilot."

She drew a shaken breath. "Must I forever hide away when my lord goes into peril?"

He stopped still and looked upon her. "But I thought—" he began.

"That I betrayed you merely to win home again? Aye." She stared at the deck. "I think you'll forgive me for that long ere I can ever forgive myself."

Very slowly he nodded. "'Tis I who must beg pardon," he said. "God grant me years enough to become worthy of you. But remain here. 'Tis needful you guard yon blueface. If I should kill Owain and the pilot—"

"Do that!" she cried.

"I'd liefer not," he said with the same gentleness as he used toward her. "Looking upon you, I can understand him so well. But—if worst come to worst—Branithar can guide us home. So watch him."

She took the gun from me and sat down. The nailed captive stood rigid with defiance.

"Come, Brother Parvus," said Sir Roger. "I may need your skill with words."

He carried his sword and had thrust a fire-gun from the weapon chest into his belt. We made our way along a corridor, up a ramp, and so to the entrance of the control turret. Its door was shut, locked from within.

Sir Roger beat upon it with the pommel of his glaive. "You two in there!" he shouted. "Yield yourselves!"

"And if we do not?" Owain's voice drifted faintly through the panels.

"If naught else," said Roger starkly, "I'll wreck the engines and depart in my boat, leaving you adrift. But see here: I've rid myself of anger. Everything has ended for the best, and we shall indeed go home—*after* these stars have been made safe for Englishmen. You and I were

friends once, Owain. Give me your hand again. I swear no harm shall come to you."

Silence lay heavy.

Until the man behind the door said: "Aye. You were never one to break an oath, were you? Very well, come on through, Roger."

I heard the bolt click down. The baron put his hand to the door. I know not what impelled me to say, "Wait, sire," and shove myself before him.

"What is it?" he blinked.

I opened the door and stepped over the threshold. Two iron bars smashed down on my head.

The rest of this adventure must needs be told from hearsay, for I was not to come to my senses for a week. I toppled in blood, and Sir Roger thought me slain.

The moment they saw it was not the baron they had gotten, Owain and the pilot attacked him. They were armed with two unscrewed stanchions, as long and heavy as swords. Sir Roger's blade flashed. The pilot threw up his club. The blade glanced off in a shower of sparks. Sir Roger howled so the walls echoed. *"You murderers of innocence—"* His second blow knocked the bar out of a numbed hand. At his third, the blue head sprang from its shoulders and bounced down the ramp.

Catherine heard the uproar. She went to the door of the salon and looked forward as if terror could sharpen her eyes to pierce the walls between. Branithar set his teeth together. He seized the misericord with his free hand. Muscles jumped forth in his shoulders. Few men could have drawn that blade, but Branithar did.

My lady heard the noise and whirled. Branithar was rounding the table. His right hand hung torn, astream with blood, but the knife gleamed in his left.

She raised her gun. "Back!" she yelled.

"Put that down," he said scornfully. "You'd never use it. You never saw enough stars at Terra, with wise enough vision. If anything goes wrong in the bows, I am your only way home."

She looked into the eyes of her husband's enemy, and shot him dead. Then she ran toward the turret.

Sir Owain Montbelle had scampered back into that chamber. He could not fend off the sheer fury of Sir Roger's assault. The baron drew his gun. Owain snatched up a book and held it before his breast.

"Have a care!" he panted. "This is the ship's log. It has the notes on Terra's position. There are no others."

"You lie. There's Branithar's mind." Nonetheless, Sir Roger thrust the gun back in his belt as he stalked forward. "I'm sorry to outrage clean steel with your blood. You killed Brother Parvus and you're going to die."

Owain poised. His stanchion was a clumsy weapon. But he raised his arm and hurled it. Struck across the brow, Sir Roger lurched backward. Owain sprang, snatched the gun from

the stunned man's belt, and dodged a feeble sword-slash. He scuttled clear, yelling his triumph. Roger stumbled toward him. Owain took aim.

Catherine appeared in the door. Her gun flamed. The book of her journey vanished in smoke and ash. Owain screamed in anguish. Coldly, she fired again, and he fell.

She flung herself into Roger's arms and wept. He comforted her.

Afterward he said ruefully: "I fear we've managed ill. Now the way home is indeed lost."

"It doesn't matter," she whispered. "Where you are, there is England."

Epilogue

A noise of trumpets and cloven air broke loose. The captain laid the typescript down and pressed an intercom button. "What's going on?" he snapped.

"That eight-legged seneschal up at the castle finally got hold of his boss, sir," answered the voice of the sociotech. "As near as I can make out, the planetary duke was out on safari, and it took all this while to locate him. He uses a whole continent for his hunting preserve. Anyhow, he's just now arriving. Come see the show. A hundred antigrav aircraft—good Lord!—the ones that've landed are disgorging horsemen!"

"Ceremonial, no doubt. Just a minute and I'll be there." The captain glared at the typescript. He had read about halfway through it. How could he talk intelligently to this fantastic overlord without some inkling of what had really developed out here?

He skimmed hastily, page after page. The chronicle of the Wersgor Crusade was long and thunderous. Suffice it to read the conclusion, how King Roger I was crowned by the Archbishop of New Canterbury, and reigned for many fruitful years.

But what had *happened?* Oh, sure, one way or another the English won their battles. Eventually they acquired enough actual strength to be independent of their leader's luck and cunning. But their society! How could even their language, let alone

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their institutions, have survived contact with old and sophisticated civilizations? Hang it, why had the sociotech translated this long-winded Brother Parvus at all, unless some significant data were included? Wait. Yes. A passage near the end caught the captain's eye. He read:

". . . I have remarked that Sir Roger de Tourneville established the feudal system on newly conquered worlds given into his care by the allies. Some latter-day mockers of my noble master have implied he did this only because he knew nothing better to do. I refute this. As I said before, the collapse of Wersgorixan was not unlike the collapse of Rome, and similar problems found a similar answer. His advantage lay in having that answer ready to hand, the experience of many Terrestrial centuries.

"To be sure, each planet was a separate case requiring separate treatment. However, most of them had certain important things in common. The native populations were eager to follow the behest of us, their liberators. Quite apart from gratitude, they were poor ignorant folk, their own civilizations long ago obliterated; they needed guidance in all things. By embracing the Faith, they proved they had souls. This forced our English clergy to ordain converts in great haste. Father Simon found texts of Scripture and the Church Fathers to support this practical necessity—indeed, while he himself never claimed so, it would seem that the veritable God consecrated him a bishop by sending him so far out *in partibus infieldium*. Once this is granted, it follows that he did not exceed his authority in planting the seed of our own Catholic Church. Of course, in his day we were always careful to speak of the Archbishop of New Canterbury as 'our' Pope, or the 'Popelet,' to remind us that this was a mere agent of the true Holy Father, whom we could not find. I deplore the carelessness of the younger generations in this matter of titles.

"Oddly enough, no few Wersgorix soon came to accept the new order. Their central government had always been a distant thing to them, a mere collector of taxes and enforcer of arbitrary laws. Many a blueskin found his imagination captured by our rich ceremonial and by a government of individual nobles whom he could meet face to face. Moreover, by loyally serving these overlords, he might hope to regain an estate, or even a title. Of the Wersgorix who have repented their sins and become valuable Christian Englishmen, I need only mention our one-time foe Huruga, whom all this world of Yorkshire honors as Archbishop William.

"But there was nothing disingenuous in Sir Roger's proceedings. He never betrayed his allies, as some have charged. He dealt with them shrewdly, but except for the necessary concealment of our true origin —which mask he dropped as soon as we had waxed strong enough not to fear exposure—he was aboveboard. It was not his fault that God always favors the English.

"Jairs, Ashenkoghli, and Pr?*tans fell in with his proposals readily enough. They had no real concept of empire. If they could have whatever planets without natives we seized, they were quite happy to leave us humans the immensely troublesome task of governing that larger number where a slave population existed. They turned hypocritical eyes away from the often bloody necessities of such government. I am sure that many of their politicians secretly rejoiced, that each new responsibility of this sort thinned out the force of their enigmatic associate: for he must create a duke and lesser gentility for it, then leave that small garrison to train the aborigines. Uprisings, internecine war, Wersgor counterattacks, reduced these tiny cadres still further. Having little military tradition of their own, the Jairs, Ashenkoghli, and Pr?*tans did not realize how those cruel years welded bonds of loyalty between native peasants and English aristocrats. Also, being somewhat effete, they did not foresee how lustily humans would breed.

"So in the end, when all these facts were pikestaff plain, it was too late. Our allies were still only three nations, each with its own language and way of life. Springing up around them were a hundred races, united in Christendom, the English tongue, and the English crown. Even if we humans had wished, we could not have changed this. Indeed, we were about as surprised as anyone.

"As proof that Sir Roger never

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plotted against his allies, consider how easily he could have overrun them in his old age, when he ruled the mightiest nation ever seen among these stars. But he leaned backward to be generous. It was not his doing that their own younger generation, awestruck by our successes, began more and more to imitate our ways . . ."

The captain put the pages aside and hurried out to the main airlock entrance. The ramp had been let down, and a redhaired human giant was striding up to greet him. Fantastically clad, bearing a florid ornamental sword, he also carried a businesslike blast gun. Behind him an honor guard of riflemen in Lincoln green stood at attention. Over their heads fluttered a banner with the arms of a cadet branch of the great Hameward family.

The captain's hand was engulfed in a hairy ducal paw. The sociotech translated a distorted English: "At last! God be praised, they've finally learned to build spaceships on Old Earth! Welcome, good sir!"

"But why did you never find us . . . er . . . your grace?" stammered the captain.

"Oh, we searched. For generations every young knight went looking for Earth, unless he chose to look for the Holy Grail. But you know how many suns there are. And even more toward the center of the galaxy—where we encountered still other starfaring peoples. Commerce, exploration, war, everything drew us inward, away from this thinly starred spiral arm. You realize this is only a poor outlying province you've come upon. The King and the Pope dwell away off in the Seventh Heaven . . . Finally the quest petered out. In past centuries, Old Earth has become little more than a tradition." His big face beamed. "But now it's all turned topsy-turvy. *You* found *us!* Most wonderful! Tell me at once, has the Holy Land been liberated from the paynim?"

"Well," said Captain Yeshu haLevy, who was a loyal citizen of the Israeli Empire, "yes."

"Too bad. I'd have loved a fresh crusade. Life's been dull since we conquered the Dragons ten years ago. They say, however, that the royal expeditions to the Sagittarian starclouds have turned up some very promising planets— But see here! You must come over to the castle. I'll entertain you as best I can, and outfit you for the trip to the King. That's tricky navigation, but I'll furnish you with an astrologer who knows the way."

"Now what did he say?" asked Captain haLevy, when the bass burble had stopped.

The sociotech explained.

Captain haLevy turned fire color. "No astrologer is going to touch my ship!"

The sociotech sighed. He'd have a lot of work to do in the coming years.

THE END

(*Continued from page 7*)
a good many years of work, and several million dollars.

At this period of history, the United States Government quite commonly makes "development contract" arrangements with industrial companies, to bridge that gap. If the government wants to go from some laboratory gadget to a useful-to-the-Navy unit, a contract with the appropriate company, say the Alphamega Company, is signed. Under this contract, the government pays the research costs—win or lose. If the project proves a dud, the government pays the costs of research, and, of course, the company has had its overhead, its staff's salaries, et cetera, paid for a period of months or years, plus the advantages gained from any incidental discoveries made along the way.

The assigned project of making a isostatic framismeter, we'll say, has proven a complete bust after two years of work by a staff of thirty people. The government has paid the bill. But . . . the technique for drawing malleable silicon wire, developed in the course of the project, gives the company a new product to market.

If the project does work out, however, the Alphamega company naturally is in the best possible position to supply the government with the devices it wants. The government said it wanted those isostatic framismeters; the Alphamega company is, naturally, the preferred supplier.

This constitutes a lovely "heads I win; tails you loose" type game. Let's refer to that as a "hiwtyl" type setup.

Now if there were a casino somewhere running standard dice, poker, roulette, et cetera, games, and a hiwtyl game, anyone who put his money on the roulette table would, properly, be suspected of being slightly nicked in the noggin.

Research—real, honest-to-God research—means you're exploring into the Unknown, in hopes that something in the area can (1) be made known, and (2) turn out to be valuable. It's strictly a gamble—and an honest gamble. It's definitely not a hiwtyl game. Many a megabuck has sunk quietly down into the Unknown and never come up again with anything but a few bubbles that burst.

So long as the government offers development contracts, there is a hiwtyl game available to play. Any company that plays the old-fashioned honest research game is then in the position of turning its back on a sure-thing bet, and investing money in blue-sky research.

Consequence: unless the government can be interested in an invention, and let a hiwtyl development contract for its engineering working-out, modern companies are reluctant to do anything about it.

This throws another very interesting block in the inventor's path. Of course, if what he's found is a new process of beauty-cream manufacture, he won't have the difficulty; there is no government-operated hiwtyl game in that area. But, if he's found a new technique of communication

that doesn't use electro-magnetic propagation—the government is looking for one!—he has the hiwtyl game problem to buck.

Try to give a good, solid argument as to why a private industry should invest several megabucks in a research project that the government says isn't worth while—although the government has said it wants a device of the class the inventor claims.

Essentially, the only possible argument is to quote Dickens: "The law is an ass!" and the government is, of course, the source of laws.

Then there's a further problem in the modern economic world. If there is a true break-through invention, no matter what field it be in, it means there must be very broad implications. Suppose somebody invents a gadget that will separate isotopes—natural, stable isotopes or unnatural unstable ones—that's about as expensive and complicated as a modern cream separator. This is of interest only in nucleonics? Hah! Look, man, if it'll separate isotopes, it will damn well separate elements—and that means the whole electronics industry will be rearranged, because hyper-pure germanium and silicon will become available at cheap prices. And electrical engineering will undergo some major changes, because hyper-pure iron for transformer and armature magnetic material will be cheap. And probably some modification will lead to a process of separating sea water into salt and pure water for one dollar per one thousand cubic feet.

Almost any break-through in any area leads to broad spill-over applications.

Dean's drive gadget implies new fundamental approaches in particle physics, of course, as well as new approaches in cosmology, since galaxies may turn out to have Dean-drive effects naturally . . .

Now suppose the Iota Company, a small outfit with three Ph.D.'s running the whole show, plus one of the wives acting as secretary, stenographer, and gopher-girl. (A gopher-girl is the girl who has to go-fer whatever happens to be needed.) They've got a consulting research setup, and by pretty steady application, plus ingenuity, are doing fairly well. They don't get government development contracts, because they're not big enough. They're in a position very different indeed from the Brontosauric Manufacturing Company, which is operating practically ninety-five per cent of its labs on government-financed research.

The Iota Company is in a position to start checking on new break-through ideas . . . but no small company can possibly handle the immense implications of a true break-through. What can they hope to get out of testing and proving that the vest-pocket isotope-separator actually works? It'll take the huge, and broadly distributed facilities of the Brontosauric Manufacturing Company to apply the thing!

In other words, there is no logical

reason why either the huge Brontosauric Manufacturing Company, or the tiny Iota Company should tackle the inventor's break-through device.

Fortunately, human beings are not logical. They're so illogical, in fact, that the Iota gang will tackle the darned thing just out of pure, cussed curiosity—and the Brontosauric outfit is apt to get an order from the Chairman of the Board to look into it because he, as an individual, whimsical, illogical human being has, somehow and irrationally, become curious about it himself.

Now: In view of the fact that the government scientists are still—and somewhat defensively!—insisting the Dean device doesn't work, is there any strictly logical reason why any company should invest time, effort and money in investigating it?

Or, of course, any other break-through device?

Finally, the system of development contracts runs into an additional fundamental difficulty; that break-through devices and discoveries are, by the meaning of the term "break-through," not logically predictable. (They may be logically explainable after the fact—but not before. Hindsight has a curious blinding effect; it makes one blind to the fact that it could not be predicted logically, although it can be explained logically.) This means that no development contract will ever be made with anyone for producing a break-through.

Put it in these terms: If the United States Government had had the system of development contracts during the last century and a half, would it have been even faintly probable that it would have:

1. Let a contract to develop a new, high-speed communication method to a medium-to-well known portrait painter by the name of Samuel F. B. Morse?

2. If the government had, by some incredible illogic, given a development contract for a "musical telegraph" to a minor Boston-area teacher of the deaf, they wouldn't have gotten one. Alexander Graham Bell never did succeed in inventing what he set out to produce—and it was many decades before the Bell Laboratories finally did perfect carrier-current transmission systems.

3. Given a contract to develop a flying machine to a two-man bicycle repair shop in Akron, Ohio?

4. Drawn up a contract for the development of an electric light and power system with a man who never finished grammar school, when the most eminent physicists of the world had mathematically proven the thing was impossible?

5. The great research facilities of the Bell Telephone system had been directed, for some years, toward developing something that could amplify electrical signals. It's doubtful that the government would have by-passed them, and given the research contract to a kid by the name of Lee de Forest. However . . . Fate did just that.

The trouble with the development contract concept is that it inevitably fails to recognize that the true break-throughs are not logically predictable . . . and never will be. Yet by emphasizing the real, genuine value of logically-predictable research, it makes the inherently improbable break-through buck logical opposition, after it has successfully bucked the opposition of the Unknown.

It's the old proposition, "If the idea is so good, somebody would have thought of it long ago—someone with proper training in that field, of course. So there must be something wrong with your idea," but now reinforced with the added argument, ". . . and if it was really good, the government would snap it up at once!"

Problem for the future: How can the break-through inventor get a hearing?

Norman Dean's gotten his hearing, now—somewhat late, to be sure, from the viewpoint of the United States! But how about all the other devices and principles we want?

And, of course, what I've said has been United States-oriented. Let's not forget that the strong-focusing principle that made possible the multi-billion-volt particle accelerators, was invented by a man who was *not* (1.) in nuclear physics or particle accelerator work; he was an elevator electrical system engineer. (2.) He was *not* living anywhere near any nuclear physics labs; he was in Athens, Greece.

It is certainly safe to say that the world did *not* expect to get a break-through contribution on particle accelerator design from a Greek elevator electrical engineer. And, because "his mathematics was faulty," the United States experts, when offered the idea, turned it down. Nicholas Christofilos presented it in straight-algebra terms, instead of properly sanctified differential equations.

That time, too, Science was finally clubbed into accepting a major contribution by legislative process; by the time professional scientists did finally get the idea, Christofilos had a patent on it, and the patent law forced the professionals to acknowledge his achievement. If it had not been for that strictly legislative mechanism, it's a lead-pipe cinch that we would never have heard further from Nicholas Christofilos, nor heard of his original contribution. No journal of physics ever published his original paper; therefore, without the purely legalistic matter of a patent, Christofilos' claim to priority would have had absolutely no standing in Science.

Is there, somewhere out there among Earth's several billions, some man with a gadget that taps some totally undreamed of power source? Some non-M.D. who has *the* cure for cancer? Some back-country fellow hauling his firewood around on an antigravity gadget?

I think Emerson was wrong. The correct statement is, "Invent a better path . . . and the world will mousetrap it!" THE EDITOR.

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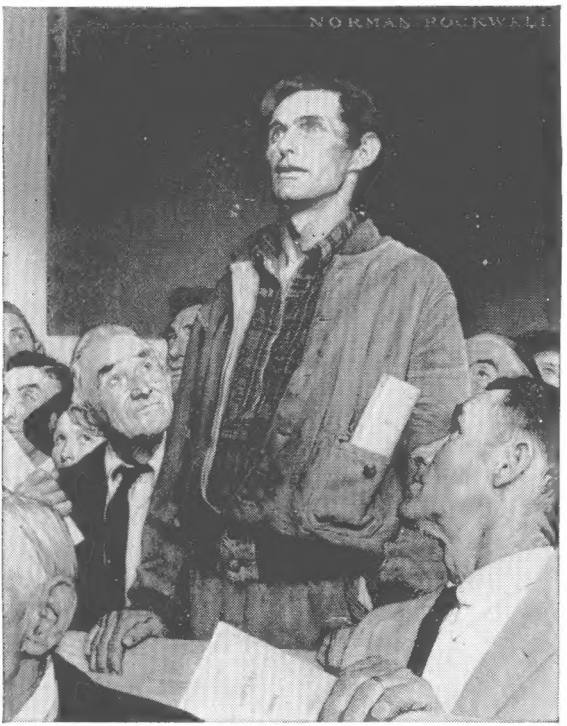

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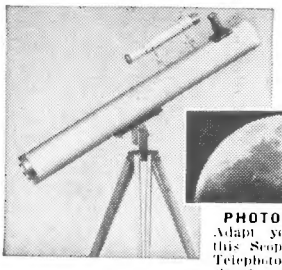

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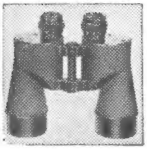

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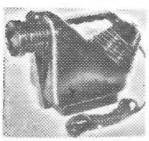

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